

FM 1-60
Reference

ARMY AIR TRAFFIC MANAGEMENT IN COMBAT ZONE

FM1-60





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CHAPTER 1 INTRODUCTION

1-1 Purpose

The purpose of air traffic management is to optimize the effectiveness of air combat operations while preventing or minimizing interference among friendly forces using the airspace. This manual contains doctrine for the regulation of Army aviation elements in the airspace over the corps area in the combat zone. Guidance is provided for maneuver force commanders, commanders of Army aviation units, and aircraft traffic management units.

1-2 Scope

This manual is primarily concerned with Army air traffic management necessary to exploit the capability of Army aviation elements to support the operations of land combat forces. Specifically, it provides doctrine for the regulation of Army aviation elements operating over the corps area in a high threat environment as well as in environments with lesser threats. Doctrine expressed has been developed in consonance with the needs of all other friendly airspace users. This manual includes a brief discussion of the relationship of the joint force commander to the service component commanders, the interrelationships among the service component commanders and among Army airspace users with regard to Army air traffic management.

This manual extends the policies, procedures, and doctrine provided in FM 100-44 (TEST) and FM 1-55. FM 100-44 (TEST) contains doctrine for airspace management for all echelons of the corps with implementing policies and procedures. FM 1-55 provides guidance

for the establishment and supervision of flight operations at fixed and semifixed airfields and heliports at Army installations.

This manual is in consonance with the following international standardization agreements: STANAG 3465, "Safety, Emergency, and Signaling Procedures for Tactical Aircraft Operations"; STANAG 3631, "War-time Air Priority System for NATO Countries"; NATO/CENTO 2134, "Offensive Air Operations;" and STANAG 3627, "Tactical Helicopter Day and Night Formation Flying."

1-3 Definitions and Abbreviations

Standard definitions and abbreviations are contained in AR 310-25 and 310-50, respectively. Abbreviations and terms not listed in above referenced ARs used in this manual are explained in the text.

1-4 Recommended Changes

Users of this publication are encouraged to submit recommended changes and comments to improve the publication. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons as well as substitute statement or paragraph should be provided for each comment to insure understanding and complete evaluation. Comments should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) in accordance with AR 310-1 and forwarded directly to Commander, United States Army Aviation Center, ATTN: ATZQ-D-TD, Fort Rucker, Alabama 36362.



CHAPTER 2

AIRSPACE AUTHORITY

The airspace over the combat zone is subject to use by all friendly forces participating in an operation. As a fundamental consideration, the primary objective of airspace management is to promote the safe, orderly, and expeditious use of airspace in the combat zone while contributing to maximum combat effectiveness and survivability. Efficient airspace management should permit combat operations without adding undue restrictions and with minimal adverse impact on the capabilities of any component.

2-1 Command Responsibilities

Theater Operations

In joint Army-Air Force operations, the Air Force component commander/commander, Air Force forces (AFCC/COMAFFOR), will be designated the Area Air Defense Commander and the Area Airspace Management Authority (AAMA) with the responsibility for operation of the Area Airspace Management System, as directed by the US unified or joint task force commander's objectives. The AAMA must have the capability to insure that friendly aircraft may enter, depart, or move within the area of operations without interfering with the effectiveness of the combat capabilities of the joint force. To achieve this objective, most Army aircraft operations in the forward area will be under procedural control rather than positive control, and indirect artillery and other fire support means will be conducted with minimum restraint. The AAMA is responsive to the needs of all airspace users to insure efficient accomplishment of the missions directed by the US unified or joint task force commander.

The AAMA coordinates, integrates, and regulates the use of airspace in an area of operations through the facilities of the airspace management system, making maximum use of the control elements and capabilities of the Army/Air Force airspace management system. The full military system and facilities are then integrated into the existing civil, national, or international control systems to effect unity of airspace management effort throughout the area of operation.

Combat Zone

The commander, US Army combat forces (normally corps), is responsible for airspace management functions within his area of territorial responsibility, as defined in the coordinated regulations and procedures established by the AAMA. The corps commander will establish an integrated airspace management system in the combat zone in coordination with other forces affected by his operations and in compliance with the jointly approved AAMA plan. To insure the success of this system, the commander should incorporate provisions for airspace management in all operational planning. He is responsible for coordinating the operations of his forces with other forces and for all Army activities involved in the use of airspace within his command. In addition, contingency plans should be developed to insure continuity of operations in a

degraded airspace management system.

The maneuver unit (normally division, brigade, battalion) commander is responsible for coordinating his airspace activities when those activities may impact upon other airspace users. In the vicinity of the line of contact or forward edge of the battle area (FEBA), the maneuver battalion commander is responsible for minute-to-minute control/coordination of those airspace users directly participating in his operations. That combat support provided in response to his requests must be coordinated in its application, both to maximize its effectiveness and to preclude mutual interference. Although there is *normally* no requirement for a special staff element at the maneuver brigade or battalion dedicated to airspace management, the commander routinely exercises control and coordination through his staff, supporting liaison/fire support representatives, and subordinate unit commanders.

Responsibility for compliance with the rules of flight, rules of engagement, and firing restrictions lies with all commanders/leaders and individuals in control of equipment or systems to which such rules or restrictions apply.

2-2 Airspace Management Area

Combat Zone

In devising procedures for airspace management in the combat zone, two distinct areas are recognized. These areas have air traffic flows that dictate unique management procedures.

TACTICAL OPERATIONS AREA

The tactical operations area is that area between the fire support coordination line (FSCL) and the rear operations area. The boundary between the tactical and rear operations area will normally be the division rear boundary. The tactical operations area is that area where maximum flexibility of airspace users is needed to insure mission accomplishment. Restrictions and constraints will be kept to an absolute minimum and applied only when necessary. Freedom of movement by Army aircraft, based on mission requirements throughout this area, is necessary. The required flexibility and potential density of traffic make individual reporting neither feasible nor desirable. However, the coordination of information reflecting the intensity of weapons and aviation

activity in the tactical operations is an important airspace management function.

REAR OPERATIONS AREA

The rear operations area is that area from the rear of the tactical operations area to the corps rear boundary. In this area the enemy threat is reduced and airspace management is more definitive. Army air traffic movements will normally be predominantly along an axis perpendicular to the FEBA and in transit between the forward and rear areas. In recognition of the more regulated and predictable traffic flow in the rear operations area, air traffic control can be described as being more formal with both the Army and the Air Force air traffic control systems being integrated to the degree feasible.

Airspace Management in the Combat Zone

While the authority of the AAMA extends over the airspace of the entire combat zone, the corps commander is responsible for airspace management functions and coordinating his activities with other forces over the corps area. Army or Air Force air traffic control facilities may issue or relay aircraft clearances depending on the facility capabilities, the integration and coordination of Army-Air Force facilities, and the rules and procedures established by the AAMA.

Coordinating Altitude

A coordinating altitude over the combat zone will normally be designated by the AAMA in coordination with the appropriate Army facilities and above which Army aircraft activity must be coordinated with Air Force tactical air control system (TACS) elements.

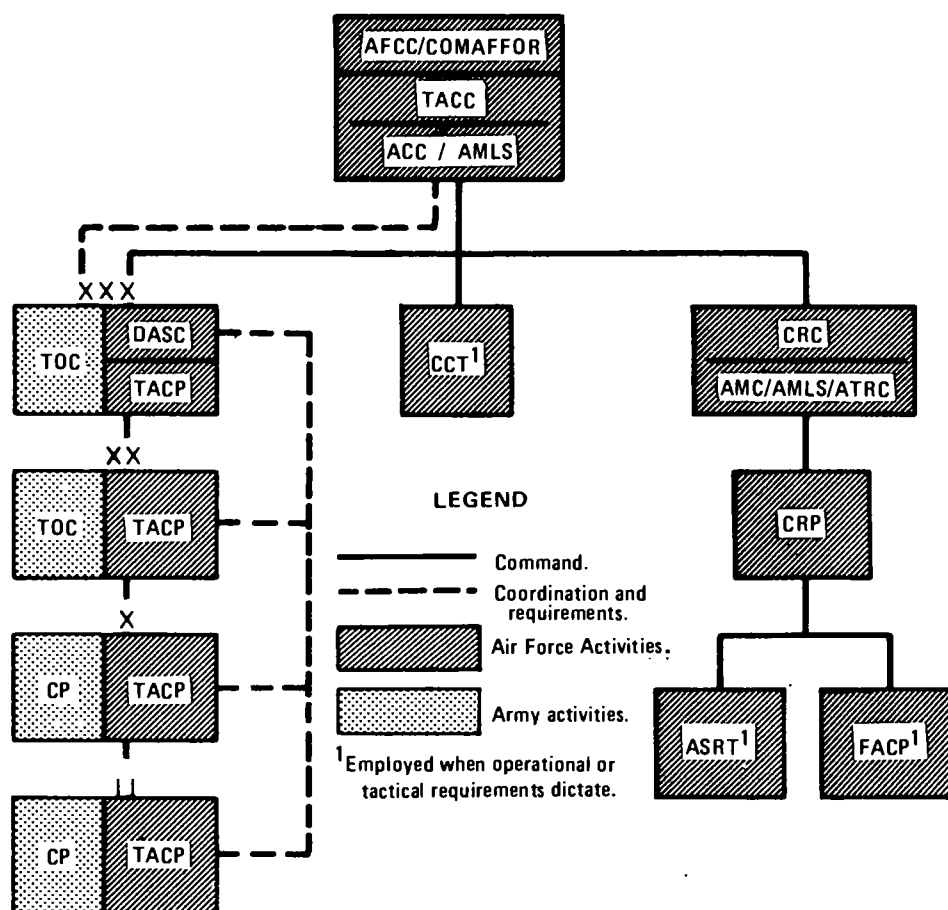


Figure 2-1. Air Force tactical air control system (TACS).

Coordinated procedures and general operating rules will be established that do not require approval or clearance for each flight of aircraft through the coordinating altitude. The coordinating altitude assigned to the Army may be below the coordinating altitude assigned to the Air Force if a buffer zone between Army and Air Force air traffic is desired. The requirement for coordination when penetrating the coordinating altitude does not deny use to either Army or Air

Force users; rather, it is a procedure to insure that air traffic information is provided to the airspace management agencies that need it to plan and conduct effective combat operations. The height of the coordinating altitude will be based on the tactical situation, mission requirements, and capabilities of the services involved. Corps requirements for changes in the coordinating altitude will be provided to the AAMA through the airspace management liaison section (AMLS) at either

the tactical air control center or the control and report-

ing center (CRC) for approval.

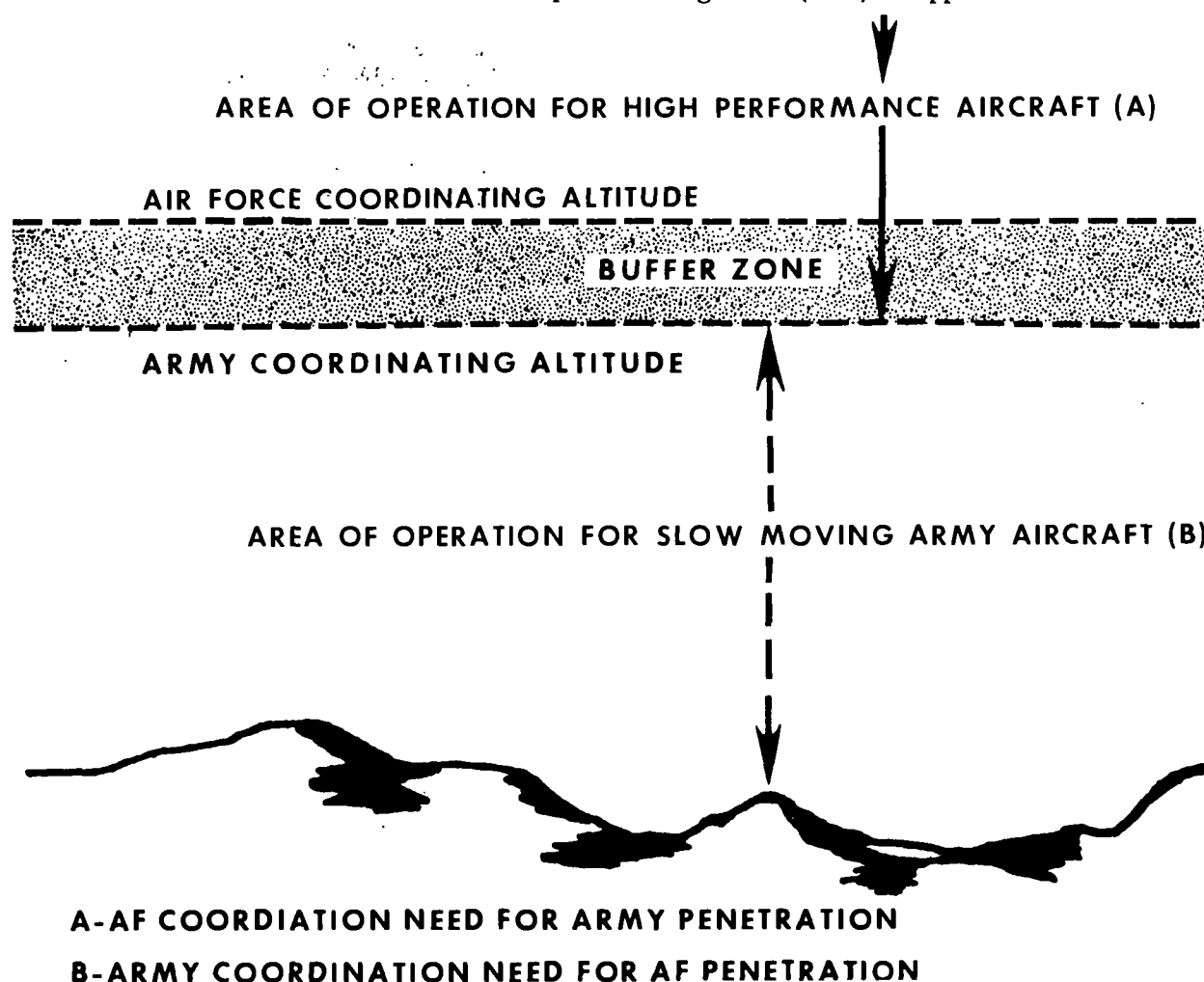


Figure 2-2. Airspace buffer zone.

Airspace Control Line

The perimeter of a segment of airspace that delineates its lateral boundaries. An airspace control line will not normally segment major Army unit areas of ground force responsibility.

Corps Area Airspace Management System

The corps airspace management system incorporates the activities of all Army elements involved in the management of airspace over the combat zone. It also provides for the effective use of airspace in support of the corps assigned mission and is based on the commander's guidance and the broad rules and procedures established by the AAMA. It must provide for the coordinated use of airspace by combat, combat support, and combat service support units.

The corps/division air defense artillery officer, aviation officer, fire support coordinator, and other staff members under the supervision of the G3 plan for the coordinated, integrated, and regulated use of airspace in the combat zone. Airspace management rules and procedures are established and issued to all major subordi-

nate units affected. These rules and procedures must allow subordinate units the degree of flexibility required to support their operations.

The airspace management element (AME) (corps and division) is under the staff supervision of the G3 and serves as the focal point for airspace management and for coordination with adjacent, higher, and lower headquarters. The AME continually receives and disseminates information and requirements essential to the management of airspace. Plans and priorities of the commander, as they affect the use of airspace, and the requirements of the airspace users are constantly updated and coordinated. The AME is a manual planning and management element and has limited information-handling capabilities. The resolution of potential airspace-user conflicts is normally accomplished by plans and SOPs. When conflicts arise that are not covered by plans and SOPs, they are resolved by using the principle of management by exception. It is important that commanders be given the necessary authority for conflict resolution at the lowest possible level hav-

ing the requirement and capability.

Army air traffic operations in the combat zone are conducted in accordance with the rules and procedures established by the corps and division commanders. Coordination of Army aviation operations is normally accomplished between affected commanders using established operational channels. Army air traffic in the rear operations area is less dense and, for the most part, may be considered to be preplanned. Requirements for terrain flying to avoid enemy radar and

missiles are less severe, thus simplifying air traffic regulation. Coordination with other aerial activities is mainly a terminal and handover problem because combat operations are not usually in progress in the rear areas. Air traffic density in the rear operations area will increase during stability and counter guerrilla operations and enemy air operations. Adequate control is required to preclude degradation of Army aviation combat operations originating from the rear or conducted in rear areas.

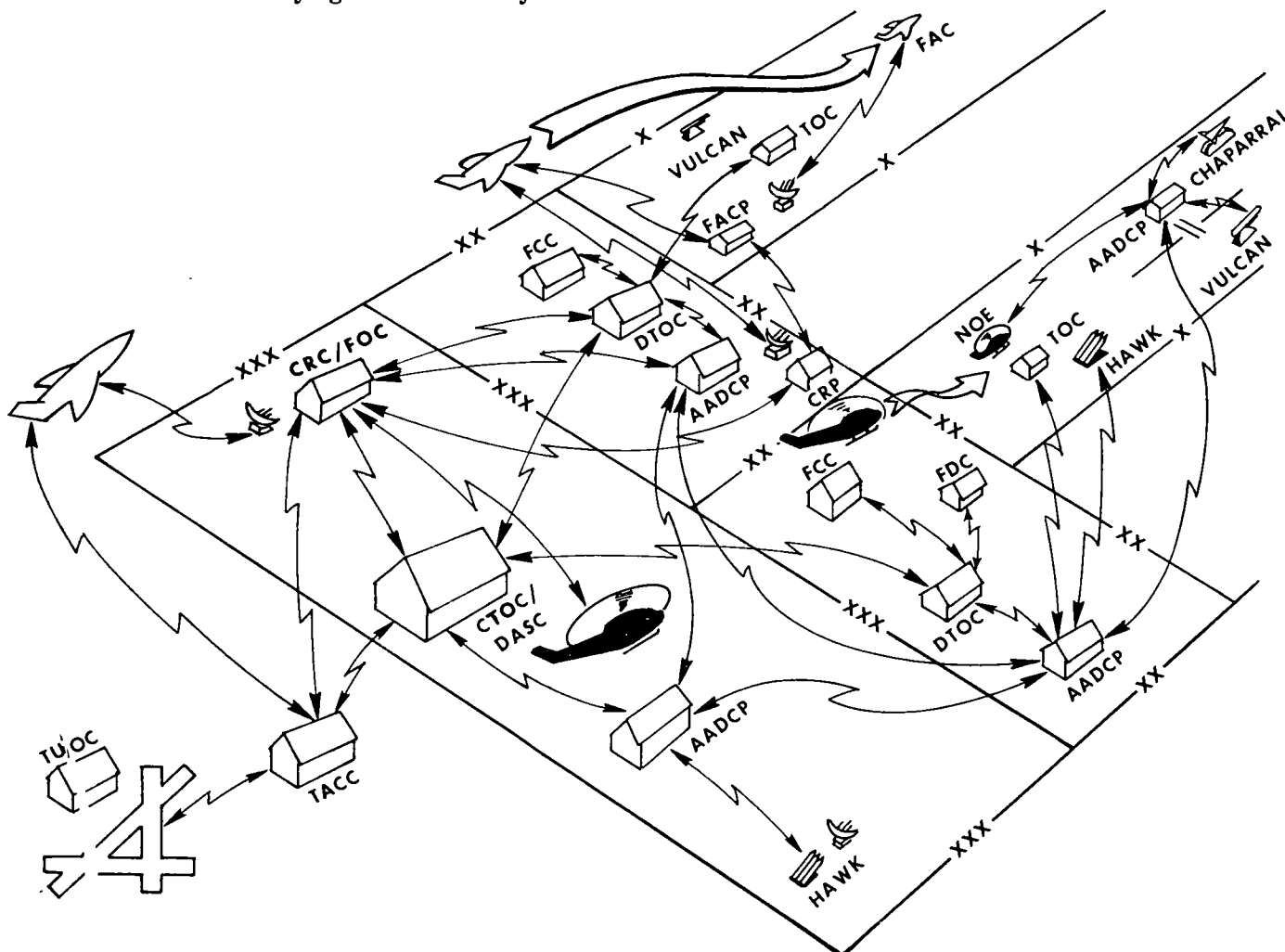


Figure 2-3. Army aviation, air defense, and Air Force control and interface.

2-3 Army Airspace Management Functions

The AME at division and corps level, under G3 supervision, serves as the commander's focal point for corps area airspace management and forms a part of the division and corps tactical operations center (TOC). The primary purpose of the AME as stated in FM 100-44(T) is to coordinate all airspace management functions among Army airspace users and with other services. Procedures discussed below apply in varying degrees to the AME at corps and division levels. User activities and requirements differ between the division area and corps area and, in this respect, the functions

of the AME will differ accordingly. A summary of functions, along with details of how coordination is accomplished, follows:

DETERMINES AIRSPACE REQUIREMENTS

The AME, in conjunction with the fire support element and the tactical air support element, determines how airspace requirements for a planned operation can best be met, then submits recommendations to the G3 and issues necessary instructions. The AME normally prepares the airspace utilization annex to operation plans/orders and maintains airspace utilization

displays. The AME performs airspace management planning for multiple Army aircraft flights. Other aircraft flights are handled as feasible. If conflicts occur in the planned use of airspace, the AME, in conjunction with the tactical air support element, fire support element, or any other element initiating the action, attempts to resolve the problem. Conflicts that cannot be resolved in accordance with command guidance, orders, and SOPs are forwarded to the G3. Airspace management information will be disseminated to the initiator of the action and appropriate management agencies as follows:

- From the AME to the appropriate flight operations center/flight coordination center (FOC/FCC).
- From the AME to the brigade command post.
- From the FOC/FCC and brigade command post to all elements concerned.

COORDINATES MULTI-AIRCRAFT AIRSPACE REQUIREMENTS

The corps G3 may determine the number of aircraft that constitutes a multiple Army aircraft flight based on the enemy helicopter threat. This number will be cleared through channels with the area air defense commander and designated in the airspace utilization annex to the division/corps operation plans or orders or prescribed in the SOP. Any helicopter formation flight that exceeds the designated number may be engaged under current rules of engagement unless it is under positive control and its passage pre-coordinated with air defense forces. This procedure, in conjunction with visual recognition, will expedite positive identification by air defense units.

COORDINATES INTERSERVICE REQUIREMENTS

The tactical air support element (or other action initiator) and AME coordinate continually to avoid airspace conflicts between the Services. The coordinating altitude affects air traffic regulatory operations and does not reduce the requirement for coordination by the AME and the action initiators.

MAINTAINS CONTINUOUS AVIATION ESTIMATE

The AME maintains continuous estimates of the *aviation* situation and represents the division aviation officer in preparing recommendations for changes in the allocation and employment of aviation assets. The AME provides information to other tactical operations center elements on aviation resources controlled by or available to the corps/division. Reports from aviation units keep the AME abreast of the aviation situation.

DISSEMINATES AVIATION CONTROL GUIDANCE

The AME regulates Army air traffic by providing information on restricted areas and other restrictions imposed on air traffic by the commander or higher headquarters. On the basis of these restrictions, the AME disseminates aviation control guidance (corridors, altitudes, areas on which combat and combat support activities will influence air traffic, and changes to the airspace utilization annex).

DETERMINES STANDARD USE ROUTES REQUIREMENTS

The corps AME will determine corps requirements for standard use Army aircraft routes in the rear operations area. The purpose of standard use Army routes is to assist in the regulation of Army air traffic habitually flying between facilities, airfields, or designated points in the rear operations area.



CHAPTER 3

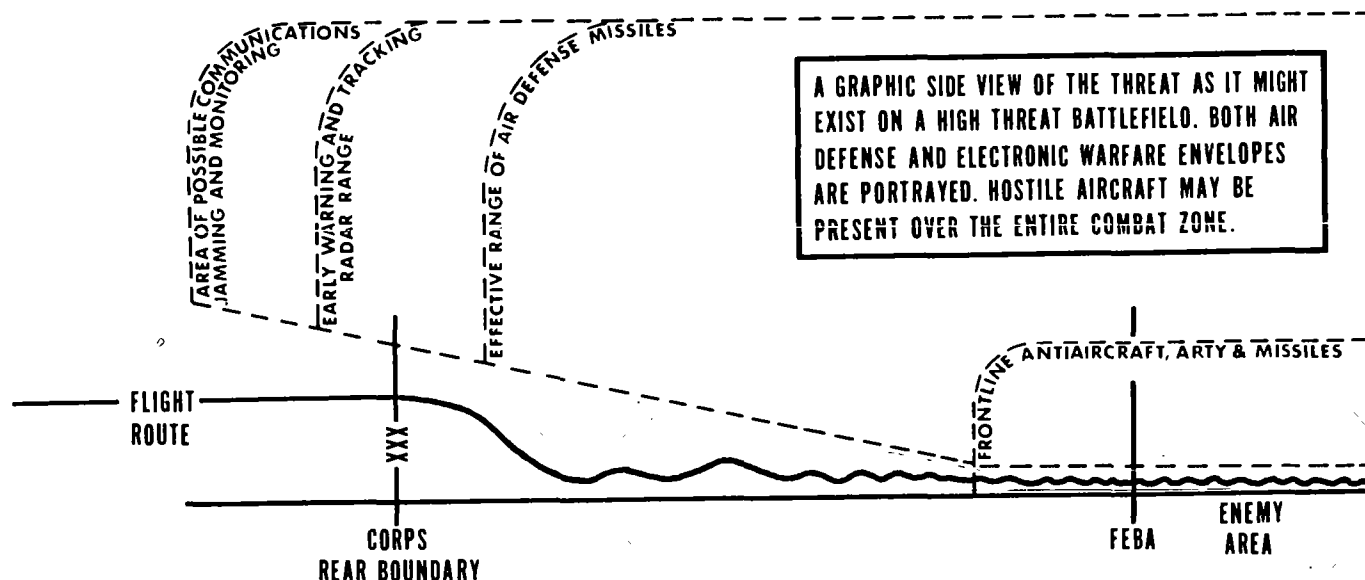
CONCEPT OF AIRCRAFT OPERATIONS IN THE CORPS AREA

User requirements and the restrictions imposed upon aircraft operations in the corps area by the high threat environment have resulted in the concept of operations described below. Also described are the aircraft traffic management systems to be used to exploit this concept during the short-range time frame (1975 - 1979) and the mid-range time frame (1980 - 1985).

3-1 Concept

Aircraft movements within the area of operation may be conducted under visual flight rules (VFR) or instrument flight rules (IFR), depending on the mission requirements, the weather and visibility situation, and the facilities available. Enemy threat considerations dictate the altitude levels at which Army aircraft will operate. In the forward areas, enemy surveillance radar and air defense weapon capabilities will require Army aircraft to use terrain flying techniques. Aviators must take advantage of concealment afforded by terrain, vegetation, and manmade features. In rear areas, aircraft operations may be conducted at higher flight levels depending on the threat. However, whether in a forward or rear area, aviators must always take advantage of available terrain masking for cover and concealment to prevent observation or detection of the aircraft and its point of departure and landing. The following illustration shows an example of how the air defense threat will appear on the modern battlefield. The illustration graphically shows the relationship of tactical flight in rear areas to tactical flight

in the forward areas. As the aviator flies toward the forward edge of the battle area (FEBA), he must lower the flight altitude in order to remain below the air defense threat. He may be able to use standard instrument flight rules and procedures, if necessary, in rear areas where the *effective range of enemy air defense missiles* and other weapons does not threaten. Of course, the aviator must constantly be alert to the threat of possible communications jamming and monitoring throughout the battle area. Nearer the FEBA, he will encounter the range of the enemy *early warning and tracking radar*. It is important for the aviator to be aware of when he is in this radar range even though he is still outside the effective range of the enemy air defense missiles and other weapons. Although he may be beyond the range of ground-based weapons, he may be engaged by enemy aircraft. The aviator may still be able to fly at higher altitudes or use standard instrument flight procedures in this area, but should be transitioning to the lower flight altitudes of terrain flight or tactical instrument flight.



STANDARD FLIGHT REGIMES

WHAT THE SITUATION
PERMITS

TERRAIN FLIGHT REGIMES

(NOE, CONTOUR, AND LOW LEVEL FLIGHT)

DICTATED BY ENEMY DETECTION
AND ENGAGEMENT CAPABILITIES

Figure 3-1. Threat profile.

As the aviator continues to move forward toward the FEBA, he will come within the *effective range of the air defense weapons*. At this point he must always remain low enough to avoid acquisition by the *early warning and tracking radar*. In doing so, he must reduce the flight altitude to a level below the enemy threat, yet high enough to provide a safe clearance of terrain obstacles. Naturally, as the aviator flies toward the FEBA, the capability of enemy radar to acquire him will continue to increase nearer the terrain. The aviator must continue to adjust his altitude and flight route accordingly to remain below this threat or to be masked by the terrain.

Upon reaching the forward area or the destination point, the aviator will use a tactical instrument beacon to make the approach if visual flight (VFR) conditions are not encountered. If VFR conditions are encountered at the destination, then the aviator will make the approach visually and use terrain flying to continue the mission and to avoid the enemy threat.

Conversely, as the aviator flies from a forward location toward the rear of the battlefield, he can progressively increase the flight altitude to provide an added terrain obstacle clearance safety margin, yet remain below the air defense threat.

Echelon or unit forward or rear boundaries cannot be used as a reliable indication of the altitude to be flown to avoid the enemy air defense threat since these boundaries are highly mobile and are not always the same distance from the FEBA or subject to the same terrain formations. The unit boundaries depicted in the illustration are presented only to show how the threat will increase as the aviator flies nearer the FEBA and force the aviator to select lower flight altitudes. Each mission must be individually planned and an appropriate altitude profile planned to remain clear of both the threat and terrain obstacles.

To illustrate this concept, two flights are described below. The altitudes in these descriptions are used purely for sake of illustration. Current threat information should be consulted before any actual safe altitudes are established.

The following represents the progression of a helicopter flight from the corps support command (COSCOM) to a field location of a forward brigade. After a flight plan is filed and an air traffic control IFR clearance is received, the helicopter takes off and communications are initiated with the flight operations center (FOC)/Air Force control and reporting center (CRC). Aircraft location and identification will be confirmed by radar and interrogator. The helicopter proceeds via the clearance route using non-directional beacons and is monitored by radar. Although the clearance altitude will

be provided to the pilot in mean sea level (MSL), obstacle clearance altitude above ground level (AGL) is a primary concern to the aviator. By preplanning flight routes early, the interpolation of MSL flight information to AGL use is easily accomplished. As the helicopter approaches the division rear boundary, an air control line (ACL) or a predetermined transition point may be established at which the helicopter may be transitioned down to a lower altitude and handed over to the division FCC for further routing to the approach control facility serving the division main heliport or other intended destination. The division controller may assist the helicopter to execute a tactical instrument approach at his destination. Or, if weather and terrain conditions permit, he may provide a ground controlled approach monitored descent to visual flight conditions which allow the helicopter to proceed visually to the forward brigade location using terrain flying techniques. The radar-monitored descent may be flown away from the FEBA as a deceptive measure so as not to indicate the flight's destination point to the enemy. Additionally, this procedure will eliminate unnecessary telltale approaches to the division main heliport and will lessen the enemy's ability to fix it or to determine the helicopter's true destination. Since forward area units normally will displace and relocate navigation and letdown facilities frequently, aviators not intimately familiar with the local situation will often find it necessary to land at a facility in the division rear areas to obtain information on the tactical situation, the threat, flight routes, and tactical instrument flight procedures into the forward brigade area.

Now consider an observation helicopter returning to the COSCOM from a divisional air cavalry troop conducting a screening mission of the FEBA. Instrument meteorological conditions prevail. The pilot may file a composite special VFR/IFR flight plan by landline communications prior to departure, or conditions may require him to file an instrument flight clearance while airborne. The pilot receives his clearance from the FCC and proceeds via his clearance route. As the aircraft proceeds to the rear, the division FCC may recommend a higher flight altitude as threat conditions permit, thus increasing the safety margin for obstacle clearance. At an appropriate

FLIGHT PROFILE FROM CORPS REAR TO FWD UNIT IN BRIGADE

(ASSIGNED ALTITUDES ARE BASED ON THREAT CONSIDERATIONS AND TERRAIN CLEARANCE AS WELL AS AIRCRAFT SEPARATION)

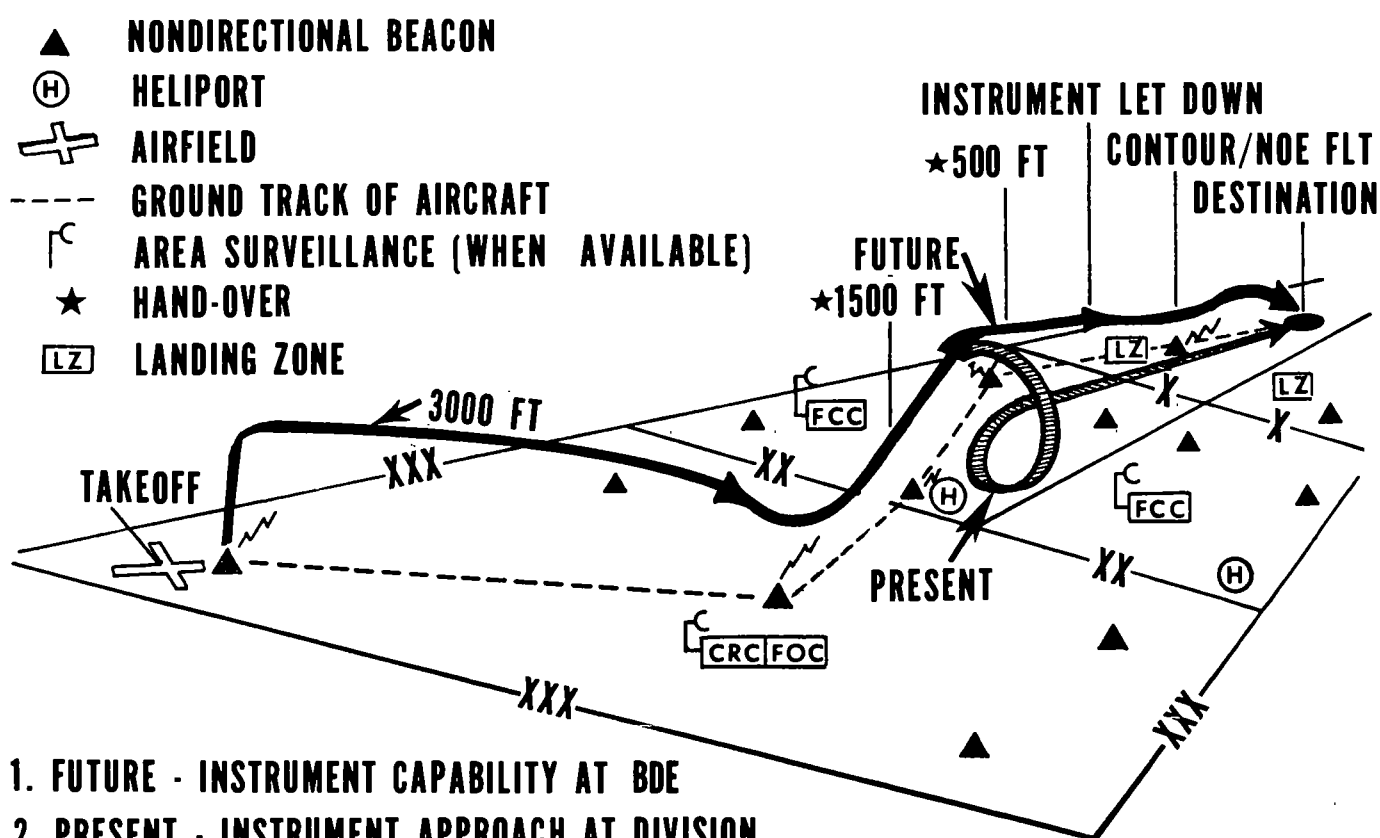


Figure 3-2.

FLIGHT PROFILE FROM FEBA TO CORPS REAR AREA

(ASSIGNED ALTITUDES ARE BASED ON THREAT CONSIDERATIONS
AND TERRAIN CLEARANCE AS WELL AS AIRCRAFT SEPARATION)

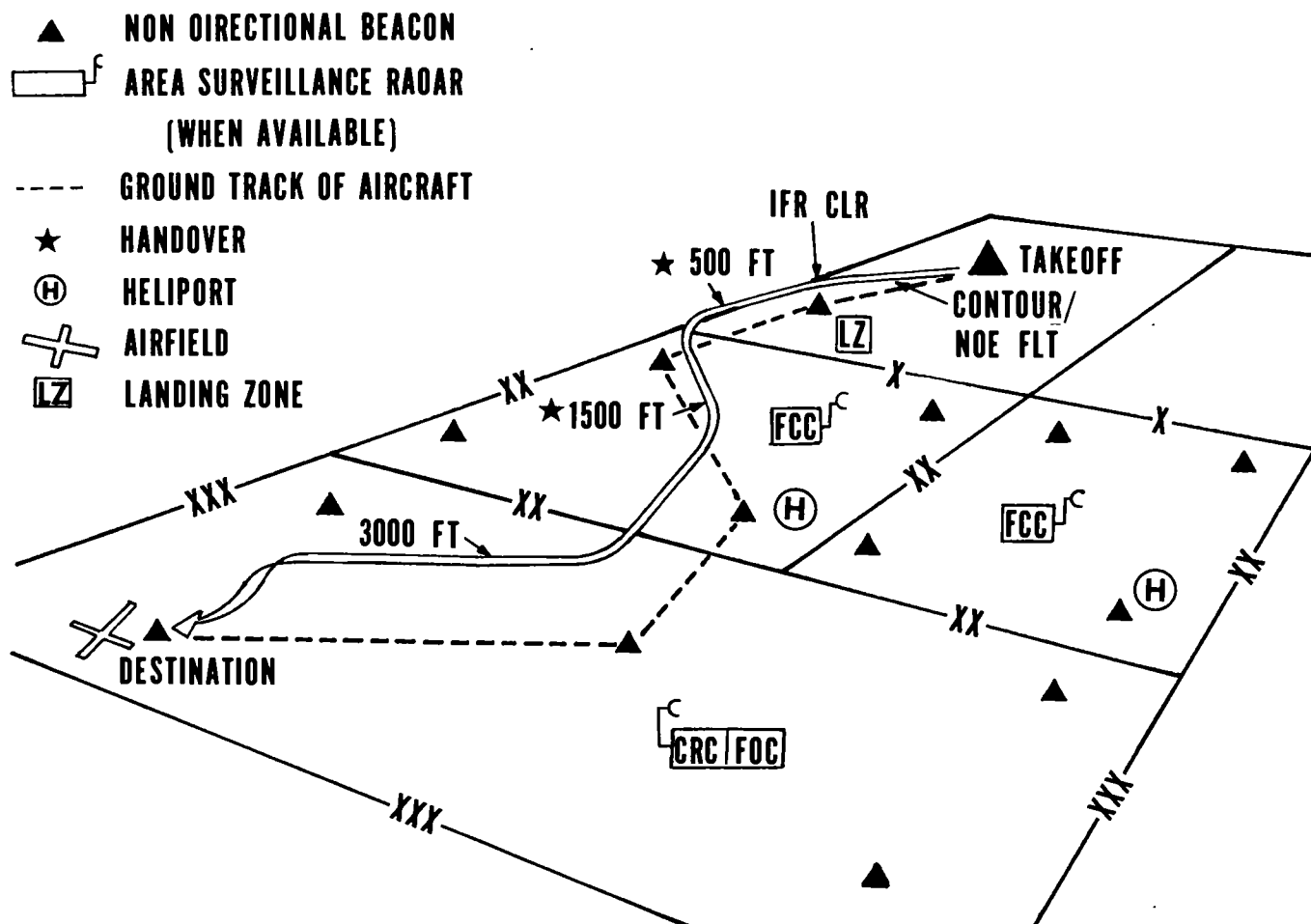


Figure 3-3.

transition point, the division FCC will hand the observation helicopter over to the corps FOC/CRC which will monitor its progress by radar and continue to provide services for the flight to its final destination. It will then be handed over to the appropriate approach control for approach clearance.

3-2 Air Traffic Management System

This paragraph is a discussion of Army air traffic control elements and a description of both the current (short-range time frame) air traffic management system and the proposal for the mid-range time frame.

Army Air Traffic Control Elements

A system of manual flight operations centers (FOC) at corps, flight coordination centers (FCC) at corps and division, and approach/departure control facilities, air-

field control towers, and navigational aids at subordinate echelon locations is provided throughout the corps area for the control and coordination of Army air traffic.

Normally, a Hawk battalion will be placed in direct support of each committed division; Hawk battalions in the combat zone are normally retained under the command and control of the senior air defense headquarters assigned to the corps. When a Hawk battalion is in direct support of a division, its radar capability may be exploited by the FCC to provide air threat warning to the division and to assist in provision of air traffic advisory/assistance services to aircraft on an exception basis.

Contact between the division FCC and aircraft in the forward areas can be maintained by use of radio or landline communications. When radio communications

is not feasible or desirable, communication for flight clearances and information can be obtained by landline using the facilities of forward tactical units. The division FCC is responsible for providing en route flight-following service for Army aircraft in forward areas. When terrain flying requirements make communications between FCC and the aircraft impossible, then the FCC must provide remote flight-following and relay teams at forward locations as needed.

The mobile teams provided by the division FCC to operate throughout the division and brigade areas, extend the communication and flight-following capability of the FCC by relaying flight-following information and flight clearances. Tactical instrument flight in the forward area depends heavily on these mobile units to emplace and operate navigational aids on request. The teams are best located at or with the brigade and divarty aviation sections and share their existing communication networks.

Using their own organic vehicles and equipment, the mobile teams can affect coordination for tactical instrument flights from either rear areas en route to forward locations or forward areas to rear terminals. Upon request, they pre-position portable radio beacon sets, AN/TRN-30, and operate them only when requested in order to reduce potential enemy electronic detection.

Army pathfinder units, when available, provide navigational assistance and aircraft control services during sustained employment of Army aircraft in forward, unprepared locations. Pathfinders can select, improve, mark, and control landing/pickup/drop zones. They may also operate at forward helipads. The pathfinder facility maintains communications with aircraft

and fire support units as necessary for control and coordination in the landing/pickup/drop zone area. Close coordination with mobile FCC team elements enhances pathfinder effectiveness and extends tactical instrument flight capabilities to any unimproved terminal location.

Short-Range Time Frame (1975-1979)

Corps Rear Area

Army air traffic in the corps rear area is controlled by the corps FOC operated by an air traffic management unit. This facility is collocated and in direct communication with the USAF CRC. Radar coverage of this area may be provided by the USAF CRC. When the FOC is physically separated from the control and reporting center, the USAF will furnish communication for connecting the two facilities. The FOC will serve as the primary agency for control of Army air traffic and provide the following services when appropriate:

- Vertical and lateral separation of aircraft during instrument flight rule operations as cleared by the USAF control and reporting center/airspace management center (CRC/AMC).
- Flight-following during both instrument and visual meteorological conditions.
- Flight plan information to USAF control and reporting center/airspace management center/Army air defense command post, or other agency designated for flight plan correlation purposes.
- Air advisory information to include friendly or enemy air, special weapons, or weather hazards.

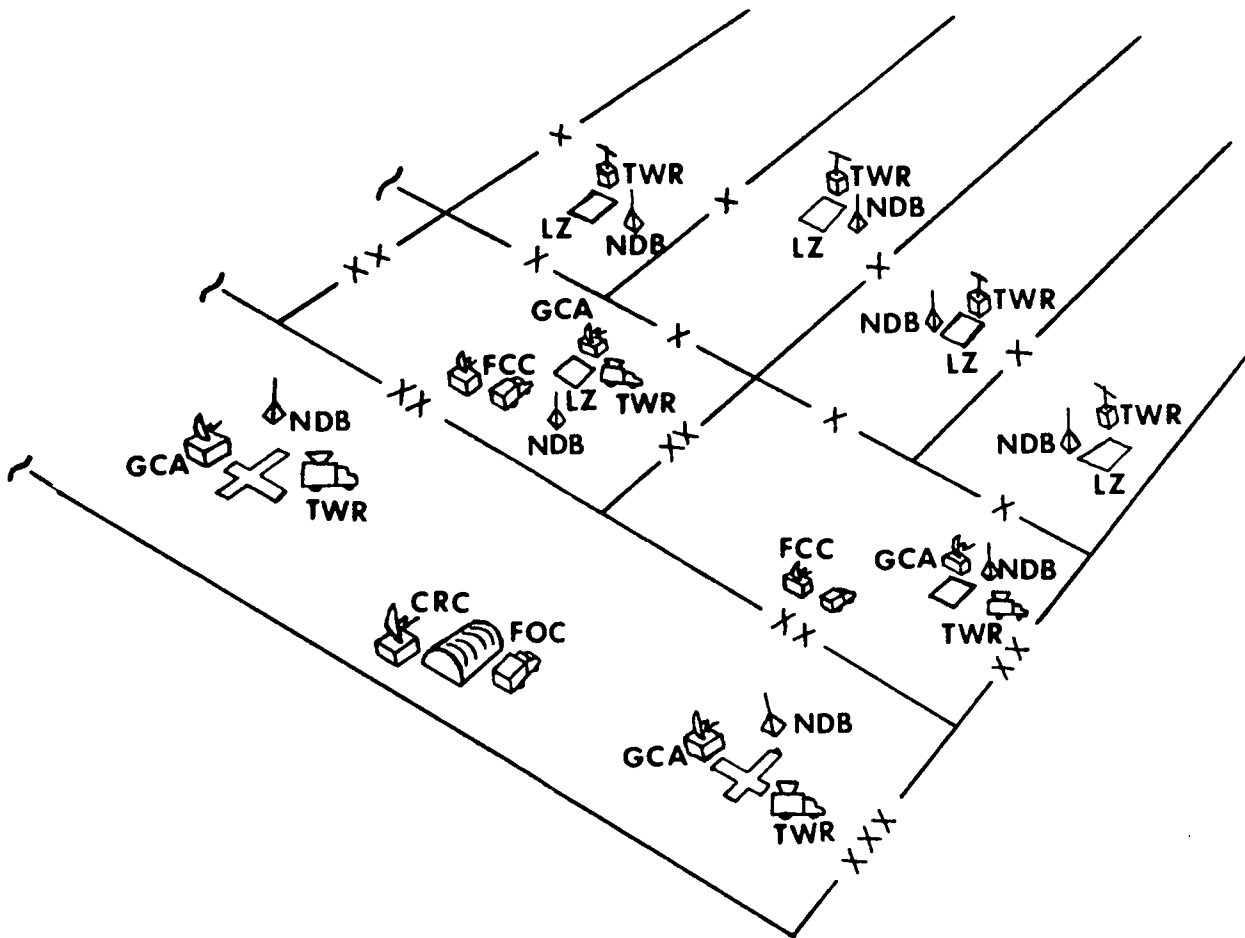


Figure 3-4. Short-range time frame (1975-1979).

In addition to operating the corps FOC, the corps air traffic management unit plans, coordinates, establishes, and operates those FCC facilities necessary to provide navigational assistance for Army aircraft throughout the entire corps area and down to the forward brigade areas.

The FOC receives en route air traffic from, or hands over traffic to, adjacent FOC and FCC. Clearance for all instrument flights will be issued by the airspace management center. The FOC issues weather reports on the basis of information provided by the corps weather teams. Constant communication must be maintained between the FCC and the Army air defense command post (AADCP) for coordination purposes. Although collocation of these facilities will assist in

communications, it also provides a lucrative target for enemy attack, a fact that should always be considered.

Corps FCC will be established, as necessary, to extend the communications of the FOC. An FCC will assume the role of the FOC if it is rendered inoperative or is being moved. A corps FCC will routinely be assigned as the alternate FOC. Corps FOC/FCC equipment consists of an AN/TSC-61A Flight Coordination Central which is housed in an air-conditioned S-280 shelter that can be transported by a 2½-ton truck or CH-47 or larger Army helicopter. Corps FCCs, whether operating in the corps area or in the division area, perform essentially the same functions (only at different echelons) and are provided with the same equipment.

AN/TSC-61A



Figure 3-5.

The following communications equipment is installed in the AN/TSC-61A to provide for necessary control and coordination:

- Three AN/ARC-51 UHF/AM radios
- Three AN/ARC-73 VHF/AM radios
- Three AN/VRC-46 VHF/FM radios
- Two AN/ARC-102 HF-SSB radios
- One TT-99 teletypewriter set

Division Rear Area

At division, the FCC will be employed to provide an extension of communications for the FOC. The FCC, normally located to permit optimum air-to-ground communications, provides a communications link between the terminal facilities of the division airfields, other airfields located nearby, division tactical operations centers, the Army air defense command post, and the FOC. The FCC—

- Monitors the operations of Army aircraft in forward areas.
- Hands over en route traffic to terminal facilities or en route facilities.

- Establishes liaison with the direct support Hawk AADCP.
- Initiates or relays warnings to Army aircraft operating in forward areas and provides minimum risk routing information when requested.
- Provides the FOC with available information of air traffic within its assigned area.
- Passes instrument flight plans to the FOC for relay to the control and reporting center/airspace management center for approval.
- Passes visual flight plans to the FOC when required.
- Relays instrument flight clearances to Army aircraft in the division area.
- Provides mobile teams throughout the division area to extend communications and navigational aids to facilitate tactical instrument flight to forward areas.

At least one division instrumented airfield will be lo-

cated in the division rear area with its associated approach and departure operations. The radar-directed, ground controlled approach which exists in current division TOE, provides interservice compatibility. An automatic direction finder (ADF) approach (backup for the ground controlled approach) should be available. Nondirectional beacons are placed as necessary throughout the division rear area to assist instrument flight routing and position determination and reporting. Control facilities at the division airfield provide a communications link to the division FCC and net with the Army aircraft communications radios of the time frame.

The division airfield equipment is as follows:

- AN/TSQ-71A Landing Control Central (ground controlled approach).
- AN/TRN-30 nondirectional beacon (ADF).
- AN/TSQ-70A Aircraft Control Central (control facility) housed in an air-conditioned shelter and transported by 1 $\frac{1}{4}$ -ton truck or by utility helicopter.
- Communications equipment which includes—
 - Three AN/ARC-57 UHF/AM radios
 - Three AN/ARC-73 VHF/AM radios
 - Three AN/VRC-46 VHF/FM radios
 - One AN/ARC-102 HF-SSB radios

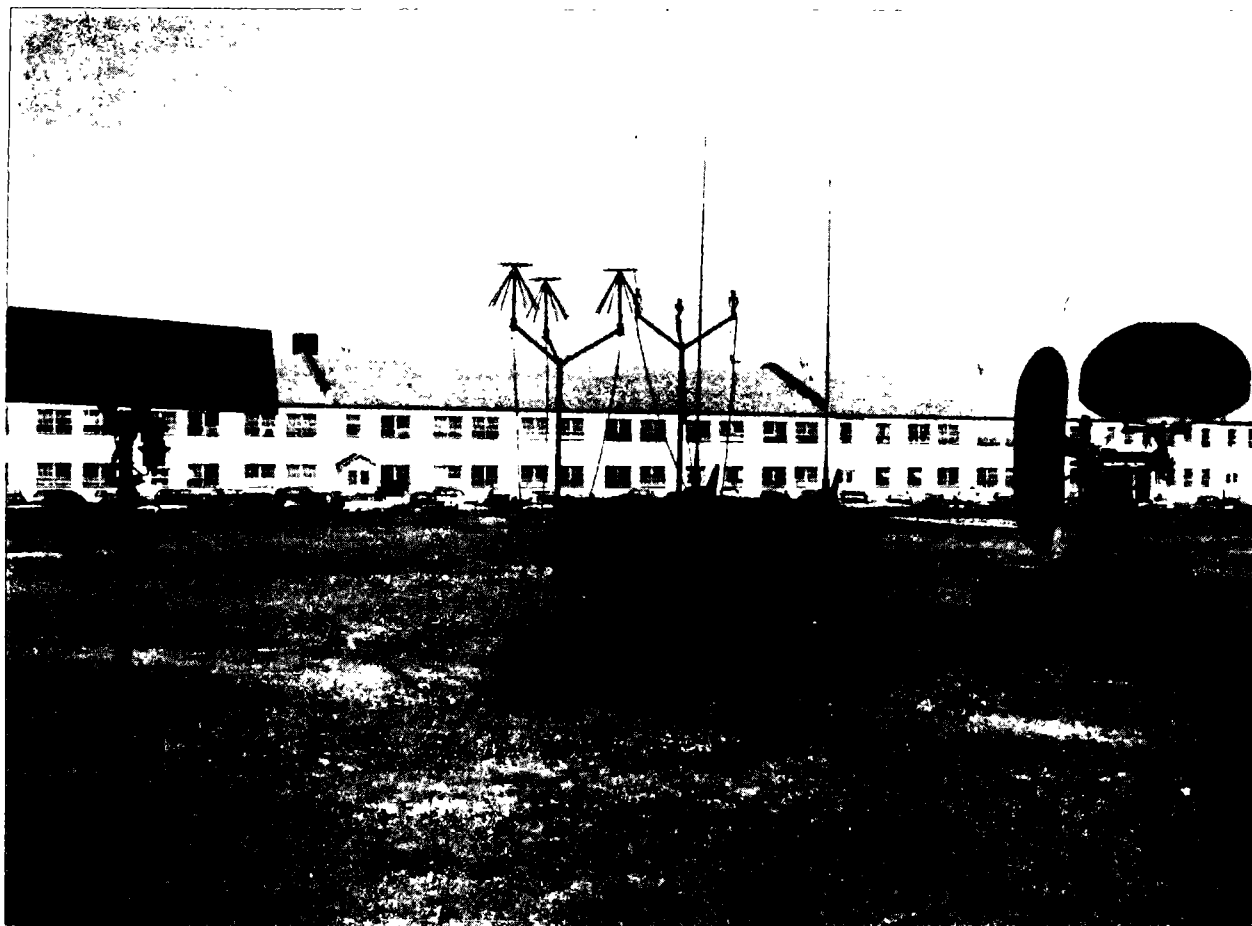


Figure 3-6. AN/TSQ-71A.

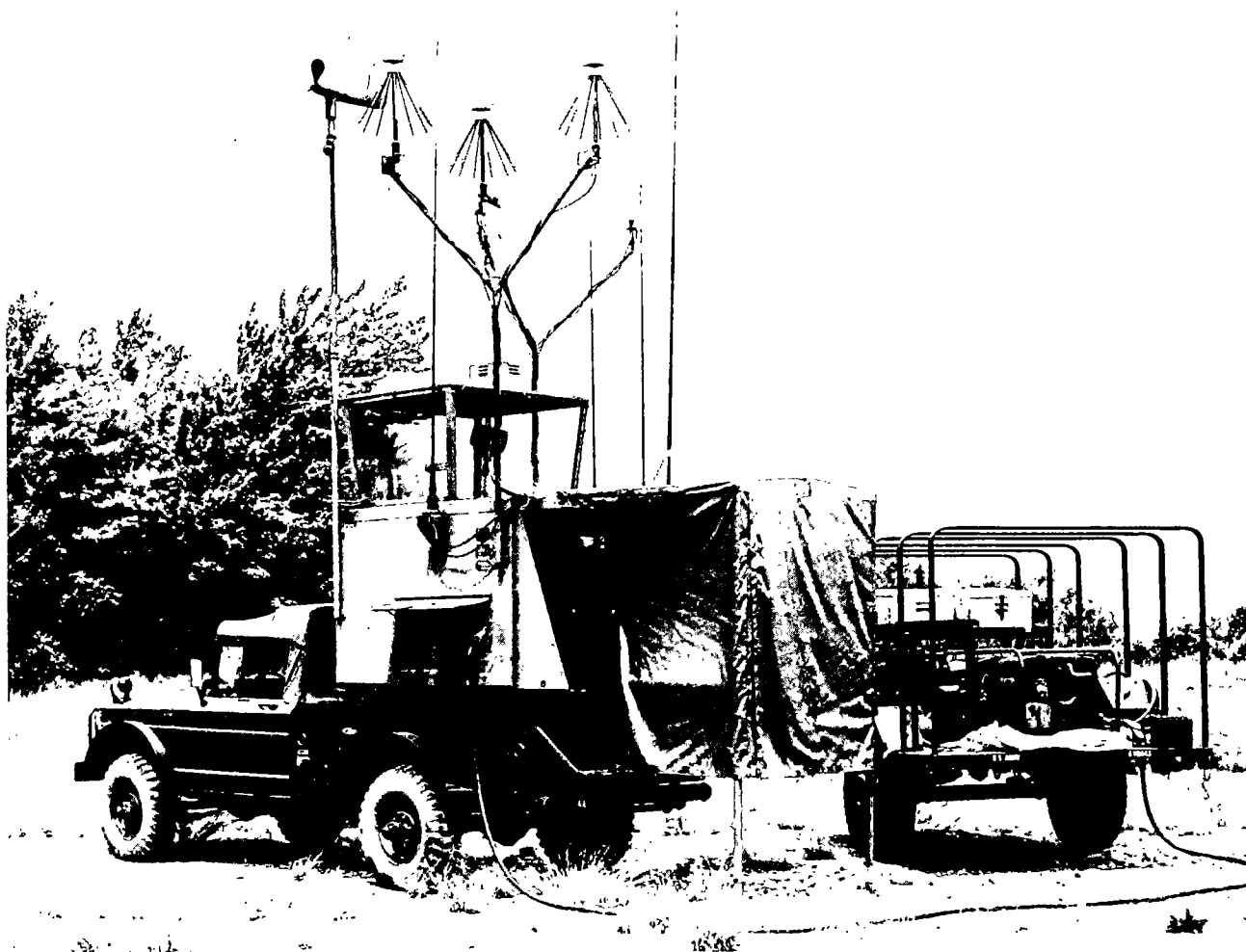


Figure 3-7(A). AN/TSQ-70A.

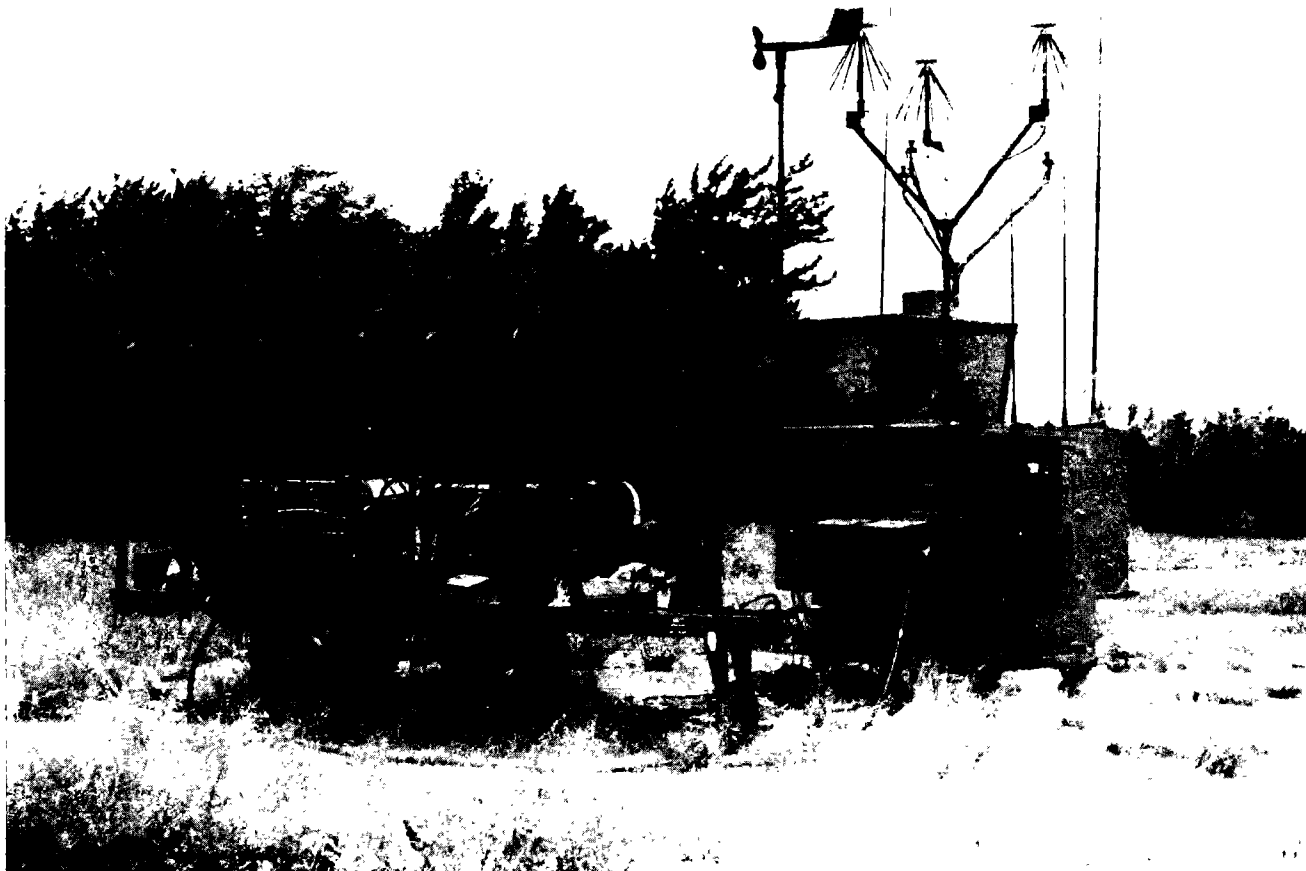


Figure 3-7(B). AN/TSQ-70A.

Brigade Area

In the brigade rear area, an instrument approach facility when made available allows aircraft entering the area under instrument conditions, to let down to visual conditions and continue the mission using terrain flying techniques. Additionally, it allows aircraft to take off into instrument conditions to either go to a forward location or to a rear terminal. It also aids aircraft returning to refuel and rearm under marginal weather conditions and will allow aircraft that enter unexpected instrument conditions to recover to visual conditions.

Mobile teams from the FCC can collocate with brigade elements and enhance visual as well as tactical instrument flight facilities and monitoring. Combining the assets available at the brigade or divarty and those of mobile FCC navigation/communications teams, visual flight following and tactical instrument flight are possible even to the most forward unprepared battle

areas.

Advance entry information for aircraft entering the brigade area is provided, when requested, through the division airspace management element the supporting aviation unit, or directly from the FCC to the brigade tactical operations center.

Terrain flying presents special problems in position determination and communications. These problems must be alleviated by means of SOP and unit training until such time as equipment is available to solve the problems.

Mid-Range Time Frame (1980-1985)

The system described below is planned to be operational during the period 1980-1985.

Corps Rear Area

Army air traffic in the corps rear area will be controlled by an FOC collocated within the USAF control and reporting center as previously described in the short-range time frame (1975 - 1979).

Division Rear Area
The FCC will perform the same services and generally

operate as described for the short-range time frame.

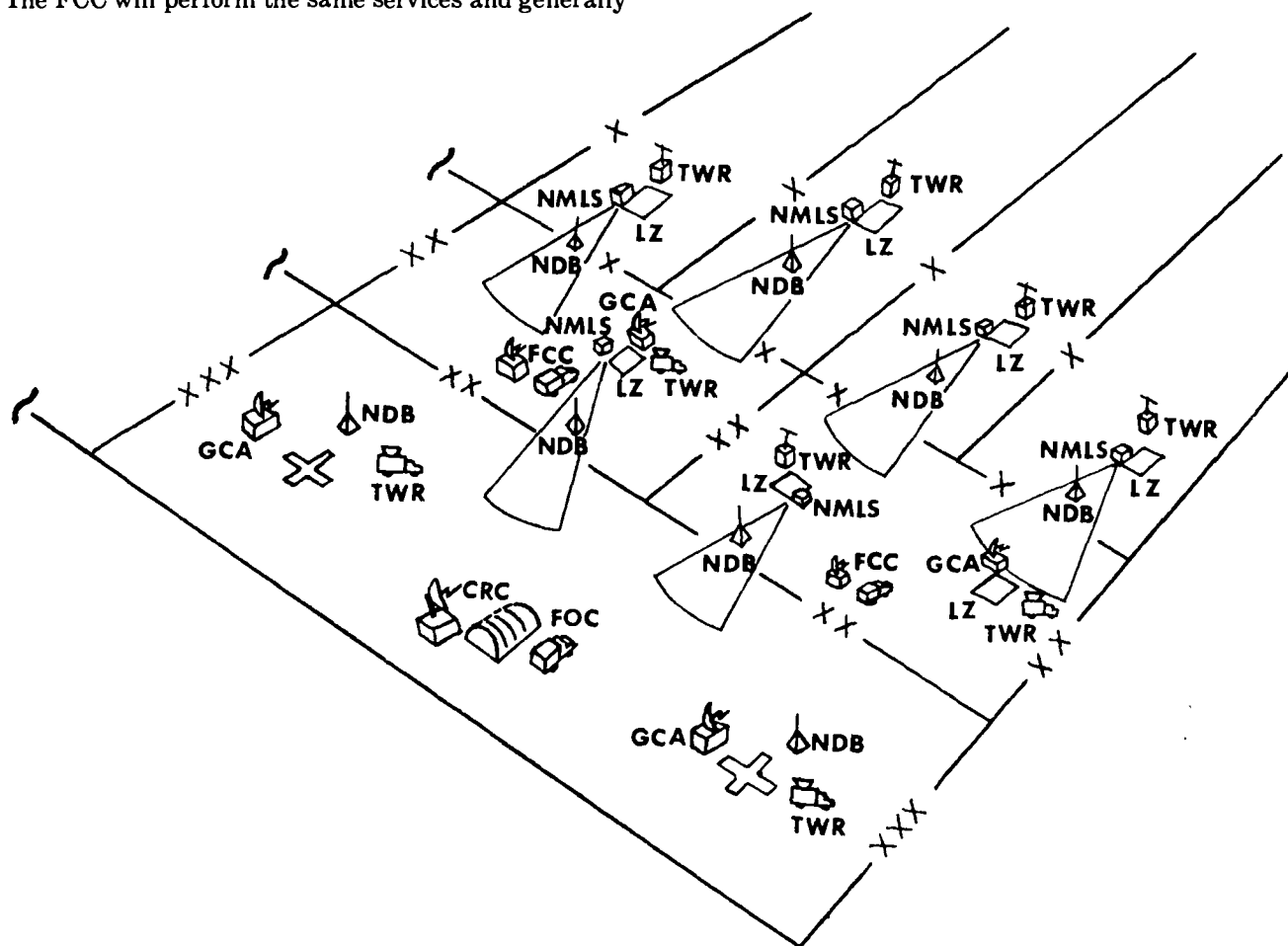


Figure 3-8. Mid-range time frame (1980 - 1985).

The FCC includes surveillance radar for coverage in the division area.

A tactical instrument landing system incorporating a directional, adjustable beam width and glide slope angle is programmed in addition to the radar-directed ground controlled approach at the division instrumented airfield. In a highly mobile situation, an instrumented airfield can be provided in the division area during moves by displacing one approach system to the new location and placing it in operation before the older airfield is closed out.

A man-portable aircraft control (radio) facility will be provided to accompany the approach facility to the new airfield so as to enable continuous operations. This facility is used as a backup for both control and approach facilities, thus allowing a satellite instrumented airfield to be set up should the situation warrant.

Brigade Area

To provide an instrument approach to assist aircraft supporting the brigade, a tactical instrument landing system will be placed as far forward as the enemy

threat allows.

A man-portable aircraft control (radio) facility is provided for traffic control and communication with the FCC or the brigade operations center.

Advance entry information for aircraft entering the brigade would be provided as necessary through the division airspace management element or from the FCC to the brigade.

An accurate, reliable, onboard navigation system providing grid coordinate readouts in the aircraft (that is not susceptible to the enemy's electronic warfare threat) is planned for use in selected aircraft operating in the brigade area.

Radios with a secure mode and capable of air-to-air and air-to-ground-to-air communications at nap-of-the-earth (NOE) altitudes are programmed for use during the mid-range time frame in all Army aircraft and control facilities.

All Army aircraft operating in tactical areas will be equipped and capable of using a tactical instrument landing system receiver as well as possessing an ADF and FM homing capability.



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CHAPTER 4

REGULATING ARMY AIR TRAFFIC

4-1 Objectives

The primary objectives of regulating Army air traffic are to—

- Expedite the safe and orderly flow of Army aircraft under either friendly or enemy air superiority conditions and in a high threat environment.
- Facilitate air defense operations.
- Assist in the identification of aircraft.
- Provide air warning and in-flight assistance to aircraft.
- Coordinate Army air traffic operations with those of other services.

The high threat environment poses special problems for the commander as he employs his aviation assets. The nature of this threat forces his aircraft to employ terrain flying techniques in order to survive, and precludes controlled IFR flight in accordance with the AR 95-series regulations. Not only must the commander cope with air defense weapons but he must also degrade the enemy's capability to jam, monitor, and acquire as targets his electronic navigation aids, communication devices, and radar signals. The latter threat makes minimum electronic communications, preferably radio silence, a requisite for aviation operations, and dictates the basic doctrine of orienting ground-based signal-emitting devices to the rear when feasible, moving them frequently and using them only when necessary. These problems as they relate to aircraft traffic regulation, together with suggested solutions, are discussed later in this chapter.

Control of Army air traffic in the corps forward area is accomplished primarily through the establishment of rules for airspace use and by implementing them with SOPs as opposed to minute-by-minute control over each element using the airspace. The maneuver force commander, usually at division level, will develop an SOP to implement the specifics of the general rules of airspace management and will insure that this SOP is workable prior to its employment under combat conditions. Factors that must be considered in developing an SOP are also listed in this chapter. A sample division air traffic management SOP is contained at appendix B.

4-2 Degree of Regulation

In determining regulation necessary for Army aircraft operations, the corps commander may authorize varying degrees of regulation. Aircraft operations in forward areas are normally less subject to exacting ATM procedures than aircraft operations in rear areas. Since control zones are subject to normal ATM procedures, activity in them must conform to the prescribed degree

of ATM control.

The procedures employed in performing aircraft traffic identification and control functions will vary from the surveillance and the advisory-only aspects of a monitoring service to one of positive control. Determination of aircraft identification requirements and the degree of aircraft traffic control required will vary with such factors as—

- The nature, magnitude, and imminence of the enemy air and air defense threat.
- The nature, capability, and controllability of deployed friendly air defense and surface-to-surface weapons systems.
- The volume of friendly air traffic.
- Weather conditions.
- The nature and intensity of friendly air and ground operations.
- The characteristics of friendly aircraft operating in the area of operations.
- The capabilities and the number of deployed airspace management/air traffic control facilities.
- The degree to which operations have been planned.
- Enemy EW capabilities.

Positive air traffic management service will be provided, as a minimum, to all flights conducted under instrument meteorological conditions that will cross an airspace control line or the air traffic control line (ATCL), either inbound or outbound. To the degree permitted by the combat situation, flight plans will be filed with FCC telephonically or while airborne on all flights requiring clearance into instrument flight conditions and all flights penetrating an airspace control line or FSCL/ATCL.

Normal peacetime traffic separation criteria and procedures should be applied; however, if these criteria are not sufficiently responsive to mission requirements, airspace management facilities may employ reduced criteria. In consonance with the degree of risk deemed acceptable by higher authority, reduced criteria may mean that—

—The system may be saturated with numerous aircraft of different types performing varied missions. Acceptance of tactical offensive and defensive traffic will not be reduced or denied as is standard in normal air traffic control procedures.

—Priority traffic will not be delayed by ATC because of a lack of standard International Civil Aviation Organization (ICAO)/Federal Aviation Administration (FAA) separation; rather, the tactical mission will continue without delay with the risk of reduced separation accepted as necessary.

—Low priority traffic may be denied access, be diverted, or be delayed when airspace saturation is imminent.

Aircraft movement within an area of operations may be conducted under instrument or visual flight rules, depending on mission requirements and system capability. Service component commanders may establish the criteria by which their assigned aircraft will be considered to be operating under IFR or VFR conditions. However, aircrews of all service components will endeavor to comply with the control procedures and weather criteria prescribed by the area airspace management authority who is responsible for the airspace in which flight is being conducted.

All air traffic operating under standard instrument flight conditions will be provided air traffic control, and to the maximum extent feasible, positive radar control. Coordination of instrument flight clearances and procedures will normally be affected through FOC/FCC air traffic control facilities designated by the airspace management center.

Air traffic operating under tactical instrument conditions use established air traffic control facilities whenever feasible and available. However, due to the very nature of tactical instrument flight and the forward locations in which it necessarily will be flown, an airspace control facility may not be located forward enough to provide flight-following or instrument flight clearance as appropriate for mission accomplishment. In this situation, the aviator must calculate his flight altitude allowing for a safety buffer and clear himself for the essential tactical operation. Contact should be established with an airspace control facility whenever possible by aircraft using tactical instrument flight procedures. However, when radio communications cannot be used to coordinate or to inform rear area airspace control facilities of tactical instrument flight, supported ground unit communications or landline nets can be used prior to takeoff when time permits. The most expeditious means should be used.

Under visual flight conditions, air traffic separation is the responsibility of aircrews. Monitoring service and/or navigational assistance may be obtained from an appropriate airspace management/aircraft traffic control facility.

Coordination of visual flights is essential, especially in the congested tactical operations area. Commanders of aviation elements and users of airspace must effect coordination using established communication links. Procedures for the general control and accountability of aircraft in the most forward areas will be based primarily on unit tactical SOP. As a general rule, commanders of aviation elements and airspace users are responsible for coordinating their airspace use activities with other units and commanders when they must share the same airspace to insure the effective-

ness of the combined arms effort.

For VFR operations within the division or brigade area, records of local flights are maintained by the operations element of the unit to which the aircraft are assigned or attached. These records can be either formal local flight plans filed by the pilot or simply a log entry recorded and retained at the unit operations element. Either record constitutes a local flight clearance. In either case, the unit with which the plan is filed, retains responsibility for flight-following.

Military flight plans will be filed with an air traffic management facility for all IFR flights. Those IFR flights initiated or originating in forward locations under tactical instrument conditions where an air traffic facility does not exist or where contact with a facility cannot be made prior to becoming airborne, an en route IFR flight clearance will be obtained as soon as contact, using all available means, is made. Mobile FCC teams in the forward areas or brigade or division artillery aviation elements can serve as a point of contact and relay to the division and corps FCC.

Specific procedures for operations conducted under local flight clearances should be included in the unit SOP, thus permitting maximum use of the organic capability with minimum response time. At the same time, knowledge of the location of organic aircraft within reasonable limits is provided to the parent unit by ATM facilities.

At corps level, the same general procedures can be applied. Local flight clearances generally are adequate for VFR flights within the corps area. When military flight plans are filed for VFR flights within the corps area, they will be used primarily for identification rather than for ATM purposes.

4-3 Aircraft VFR and Standard IFR Operations and Procedures

This paragraph presents aircraft VFR and IFR operations and procedures for Army aircraft. These IFR operations and procedures will apply to rear areas and to forward areas in the absence of a high threat. Tactical instrument flight operations and procedures to be used in forward areas where the air defense threat is great, are the subject of paragraph 4-4.

Visual and Instrument Flight Rules

Units must establish criteria to indicate the conditions under which Army aircraft are to be operated according to visual flight rules. Because of the nature of the air defense threat, many daylight flights in the division forward area will be terrain flight; and many flights originating in the corps rear will have to proceed at appropriate low altitudes into division rear, becoming terrain flight as soon as they enter division forward. Night flights will be at low-level altitudes, depending on the threat, pilot proficiency, and ambient light conditions. These factors, together with the requirement for the

Army commander to utilize fully his aviation assets, will have a direct influence on the establishment of forward area VFR/IFR criteria. Generally, IFR will apply when flight is conducted without reference to terrain features, or when visibility is such that aircraft have insufficient space in which to maneuver to avoid collision with other aircraft or terrain.

Control Zones

A control zone is established for each major airfield, to include the corps airfield, division main heliport, and other airfields as may be designated. A control zone covers a specified area and extends upward from the ground to a specified height. Personnel of the air traffic management unit coordinate hand-over points, altitudes, and other procedural matters necessary for control of aircraft operating between control zones and the FOC. Where instrument approach procedures are required for aircraft of another service entering an Army control zone, those procedures will be developed through coordination between the other service commander and the Army component commander.

TERMINAL AIRCRAFT TRAFFIC CONTROL

Terminal aircraft traffic control is exercised from an airfield control facility which issues control instructions to facilitate air traffic within the control zone. When flying VFR in a control zone, the aviator is directly responsible for avoiding collision with other aircraft, aided by traffic information issued by the control facility. When flying IFR, the pilot relies on the ATC clearance issued him at the onset of the flight, and if he loses communications with the control facility, he will follow the emergency procedures established in the Flight Information Publication or as required by the SOP. Instructions to aircraft taxiing on an airfield are issued by the control facility. Hand and light signals, when used, will be as illustrated in FM 1-105.

DEPARTURES

For aircraft departing the control zone under VFR, the control facility provides only such assistance as may be necessary for the aircraft to taxi, takeoff, and turn on course for departure under IFR. The control facility also serves as a radio relay station to request air traffic control (ATC) clearances for aircraft to operate on airways after leaving the control zone. These IFR clearances, issued by the airspace management center of the CRC, will specify the time, altitude, and fix at which the aircraft may depart the control zone. The control facility will relay each clearance to the aviator and assist the departing flight as necessary to comply with the terms of the IFR clearance.

ARRIVALS

For IFR flights entering a control zone, the FOC

or FCC notifies the control facility as to the altitude and expected time at which the aircraft will arrive at the approach fix serving the instrument airfield within the control zone. The aviator establishes radio contact with the control facility as directed by FOC/FCC. The terminal facility provides control instructions, based on aircraft approach procedures established by the commander of the corps or division area in which the terminal facility is located.

Control Areas

A control area is an airspace segment of specific dimensions forming a portion of the ATM system. Control areas extend upward from a specified level above the ground to a specified altitude. Except in the event of an emergency, aircraft being operated under IFR may enter a control area only after receiving clearance from the appropriate ATC facility. Specific types of control areas are discussed below. Use of these airspace control areas must insure that the ATM system remains flexible and also responsive to changing situations and priorities.

AIRWAYS

Airways are control area segments normally established between navigation aids to facilitate the orderly flow of aircraft traffic between designated points, including control zones.

Where the established airways system is not adequate for a planned operation, special airways can be developed for that purpose. Examples of operations requiring special airways are those involving large numbers of aircraft and those involving a mix of high performance aircraft of other services and lower performance Army aircraft.

SPECIAL AIRWAYS

Special airways or air corridors may be designated for exclusive use of high performance aircraft. Also, it is possible to designate one or more recovery corridors for emergency use such as for damaged friendly high performance aircraft returning to friendly areas. The location, including altitude, of these corridors is coordinated within the TOC or fire support coordination center (FSCC) and established in advance.

Minimum risk routes from the rear boundary of the tactical operations area forward to the FSCL are recommended by the corps AME as presenting the fewest known hazards to safe flight. The area airspace management authority will establish other service requirements for minimum risk routes and will ask corps to recommend routes to other service elements.

CORRIDOR

It may be necessary to assign an airplane to certain aircraft formations to prevent their being at-

tacked by friendly forces. A corridor is more restrictive than an MRR and other aircraft will not enter unless cleared to do so by the appropriate ATM facility.

PENETRATION AND CLIMB CORRIDORS

Where the density of other service high performance aircraft warrants, it may be necessary to establish penetration and climb corridors. Army aircraft will not operate in these corridors unless specifically cleared to do so by the appropriate ATM facility.

SEPARATION

The separation of air traffic operating on airways under IFR conditions is provided through use of—
Longitudinal separation. Aircraft flying at the same altitude are kept a minimum distance apart by longitudinal separation. This method is effective where aircraft are traveling at similar speeds, but generally is not recommended for maintaining separation of a mix of high performance and low performance aircraft. The FOC will set appropriate time spacing by taking into account aircraft speeds, traffic density, air defense threat, local conditions, and ATM SOP.

Altitude assignment. The assignment of aircraft to operate at different altitudes is particularly effective for flights involving aircraft passing each other while flying in different directions or in the same direction at different speeds.

Lateral separation. The spacing of aircraft may also be controlled by the assignment of different flight routes (airways) terminating at the same destination.

The use of reporting points for IFR flight provides the ATM agency a means of periodically determining the specific location of each aircraft. Where compulsory reporting points are used, each IFR flight passing over those points will make a voice radio report. Also, an ATM agency may request any flight to report passage over any identifiable point along an airway.

Listening Watch

While in flight, aviators maintain a constant listening watch to the extent possible with the ATM facility serving the area in which they are operating. This practice enables the facility to relay to the aviator information relative to the flight, to include airstrike, naval gunfire, and artillery fire warnings.

Flight-Following

Flight-following is a service provided by an ATM facility in which the en route progress and/or flight termination of an aircraft is determined by use of aircraft position reporting procedures. The service includes relaying to aircraft information on known factors affecting a flight such as weather conditions and planned artillery fires and airstrikes.

IFR

Through use of normal IFR position reporting procedures, FOC and FCC monitor the en route progress of IFR flights within their areas of interest.

VFR

For VFR flights, flight-following is provided by FOC/FCC upon request. Unit SOP for ATM elements providing flight-following services should be coordinated in advance with aviation units using those services. Procedures should be established for use by FOC and FCC when a scheduled report from an aircraft in flight has not been received, when a scheduled flight has not arrived or a flight plan has not been closed by a specified time, or when communication cannot be established with an aircraft. Procedures should also be established for use by FOC and FCC when search and rescue assistance is needed.

Flight Plans and Clearances

Army aircraft based in the corps forward area will be permitted to operate over the area without forwarding flight plans to any ATM service agency. Freedom of operation should not be restricted. Monitorship is highly flexible, especially as applied to VFR flights in forward areas, and can be delegated to aviation unit level at which flights can be authorized without use of any formal flight clearance or flight plan. The local flight plan or operations log entry is normally used for these flights. The two types of flight plans used for Army aircraft operations are as follows:

LOCAL FLIGHT PLAN

The local flight plan is filed, not for ATM purposes, but primarily to provide a method of accounting for the location of unit aircraft engaged in operations at any given time. This clearance is most often used for aircraft being flown from the unit without coming under the control of an ATM facility.

MILITARY FLIGHT PLAN

The military flight plan is more formal than the local flight plan. It is used primarily for ATM purposes, and is filed for standard IFR flights and for those VFR flights for which a local flight clearance is inadequate. The IFR flights using this flight plan must adhere to the information entered on the plan, to include all instructions issued by ATM agencies with regard to the flight. Aviators should obtain approval from an appropriate ATM facility for any intended deviation from the flight plan before initiating the deviation.

4-4 Tactical Instrument Flight

It is essential that Army aviation elements be able to provide firepower, movement of troops, logistical sup-

port, and surveillance and reconnaissance for the ground tactical elements of the Army even during periods of adverse weather when visual flight for all portions of a mission is not possible, is undependable, or is inconsistent. Tactical situations can be expected to require the commander to use his aviation assets within the threat environment during instrument meteorological conditions. In order to survive during such missions, aviation units must operate under instrument conditions at altitudes well below the altitudes specified in civil instrument flight rules. While standard civil rules may be compatible with threat conditions in rear areas, they will be unsatisfactory for forward areas. Tactical instrument flight provides the means to insure maximum support of ground tactical units by allowing aircraft to move about the battlefield even in adverse weather under high threat conditions. Survivability will require techniques which go beyond the use of today's conventional airways and navigational aids. Sophisticated approach procedures and equipment will not be available. Instead, flight will be performed under austere conditions requiring the highest level of aviator proficiency. Aircraft will operate routinely at reduced altitudes with minimum navigational aids and minimum air traffic control facilities and regulations. Increased dependence on preflight planning and aircrew proficiency will be essential to accomplish the mission using the tactical instrument mode of flight. Commanders will consider tactical instrument flight to be a basic aviator qualification and will train their aviators to achieve an acceptable level of proficiency.

As an example, imagine the following tactical situation. An urgent tactical situation exists in the forward area of the battlefield. Several outposts are under attack and have received heavy enemy pressure. They are unable to break contact with the enemy and are expected to be overrun soon unless extracted. As an aviator, you have been assigned the mission to extract and reposition the outposts. To complete the mission, you must fly to a location just short of the forward edge of the battle area (FEBA) using terrain flying techniques and then use nap-of-the-earth (NOE) altitudes to the general outpost line (GOPL) and perform the extraction. Presently, you are located at a basefield in the division rear area.

The weather is forecast to remain marginal until your intended departure time. You plan your mission accordingly. Shortly after takeoff from the basefield, you encounter "0-0" conditions due to heavy fog which precludes even NOE flight. However, you have radio contact with the unit at the FEBA and it reports that the ceiling there has lifted to 200 to 400 feet overcast—acceptable visual flight conditions. The problem that faces you now, is how to get from your present location to the forward area where visibility exists that will

allow mission completion and then return to the basefield. Is the mission canceled due to the weather; do you wait for conditions to improve and risk the outposts' being overrun in the meantime; or are you able to proceed with the mission even in the adverse weather condition; can you return to the basefield or a refuel or rearm point after completing the mission?

Since you knew while planning the mission that the weather was marginal and forecast to remain the same, you were able to plan ahead and develop a tactical instrument flight plan at an altitude which was commensurate with intelligence indications of enemy air defense threat capabilities within your area of operation. You made contact with units along your intended flightpath and at the destination and arranged with mobile FCC teams in the forward area to have the small man-portable pathfinder beacons deployed at preplanned locations. Confirmation of their placement and operation was received by landline. You then coordinated instructions for their activation and deactivation (upon request only, or activation at a preselected time). As a standard operating procedure, you planned your tactical instrument flight as a backup for visual flight in the event weather prohibited using tactical instrument flight. You were able to plan the flight using the lowest possible safe altitude to the vicinity of the FEBA where adequate ceiling visibility conditions exist and to execute a letdown approach to VFR conditions. Upon completing your mission, your plan provides for return to the rear area or to an alternate or subsequent location to perform other missions as needed.

This section discusses some of the basic considerations, principles, and procedures that are an integral part of planning and conducting tactical instrument flight in a high threat environment. A model tactical instrument system is described in FM 1-5. This method is the first of its kind for the United States Army. It is presented as a model to be used, modified, tested, and improved upon as appropriate. When more suitable systems tailored to the tactical environment and the mission requirements are developed through troop use, they also will be published.

Definition

Tactical instrument flight is defined as flight under instrument meteorological conditions in an area directly affected by the threat. It is used as a normal means to complete assigned missions when ceiling or visibility conditions preclude visual flight.

Capabilities

Tactical instrument flight provides the commander the capability to extend aviation operations against the enemy during periods of severely reduced visibility. Using tactical instrument flight, the commander can accomplish a mission under instrument meteorological conditions in a high threat environment that could not

be accomplished utilizing other flight techniques. It is also possible for the aviator to transition from conventional instrument flight in rear areas to low altitude operations in forward areas where enemy electronic warfare (EW) capabilities and weapons threaten. A combination of terrain flight and tactical instrument flight will enable aerial scouts to provide reconnaissance and early warning, attack helicopters to provide firepower, and utility and cargo helicopter operations to continue, even under extremely low visibility conditions.

Threat

Aviation operations against an enemy equipped with sophisticated air defense and electronic weapons will be significantly affected by the following factors. The commander may be faced with any of the following, singly or in combination, and must consider these factors in planning and execution of air operations.

- Air-to-air weapons
- Surface-to-surface weapons
- Surface-to-air missiles
- Air-to-ground missiles
- Jamming of aircraft traffic management systems
- Jamming of command and control frequencies
- Monitoring of communications among aircraft traffic by the enemy
- Monitoring command control radio nets by the enemy
- Helicopter attacks on helicopters
- High performance aircraft attacks on helicopters

Training

Tactical instrument flight can be successfully accomplished through diligent and thorough training of aircrews, air traffic management, and pathfinder personnel. Through testing, training, and practice, the capability can become a reality. Tactical instrument flight training not only should familiarize aviators with the principles and employment of tactical instrument flight in the high threat environment, it must teach them to execute an instrument flight and approach into a landing zone utilizing minimum electronic communication and navigation devices and that such flight can be accomplished safely. Unit training must be oriented toward accomplishment of the unit's mission under adverse weather and threat conditions with a minimum of assistance from electronic communication and navigation devices. Air traffic management and pathfinder personnel, as well as aircrews, also must be integrated into the training. Units must incorporate tactical instrument functions into their everyday missions. Flying at lower altitudes, minimal use of available navigation and communication equipment, detailed premission planning, and postmission debriefing are training practices that can

be used on a routine basis during normal operations. Training must emphasize flexibility in order for aviation elements to be able to respond quickly and reliably in a wide range of adverse weather situations.

Basic Principles

Because tactical instrument flight on a high threat battlefield will be required for successful around-the-clock operations, it must be a standard, well-rehearsed technique in which aircrews are highly proficient. Radio navigation routes for aircraft to follow at survivable altitudes and approach facilities in the area of operation must be established if feasible. Flight-following procedures in forward areas must be established, coordinated, and used, when available, to assist aviation crews, and allow the maximum flexibility while at the same time providing the degree of control and facilities necessary to insure mission success and flight completion. However, aircrews required to transition from visual to instrument flight to complete a mission or to return to a safe area following a tactical instrument flight must be able to determine suitable routes, minimum safe altitudes and proper letdown procedures by using map reconnaissance and SOP calculations even while in flight and without recourse to an air traffic management facility. These procedures should reveal little to the electronic listening devices of the enemy, yet be sufficiently practical for the aircraft to reach the target or destination and return. In addition to the expected air defense mission deterrents on the high threat battlefield, the enemy can jam, monitor, and acquire as potential targets, friendly electronic navigational communication devices and radar emitters. This threat makes minimum communications, preferably radio silence, a requisite for aviation operations; and dictates the basic doctrine of orienting all signal-emitting devices away from the FEBA, moving them frequently, and activating them only when necessary and using secure landline communication whenever available.

Tactical instrument flight should be controlled primarily through the use of standing operating procedures (SOP). An example of a typical unit SOP for managing tactical instrument air traffic is at appendix C. A sample SOP and checklist for planning and flying a mission using tactical instrument procedures is also contained in FM 1-5. It is mandatory that procedures be established and exercised and that aircrews and air traffic management personnel be thoroughly trained before this type of flying is conducted on the battlefield. Some of the more significant basic principles that must always be considered are discussed below. The combat situation will impose variations on procedures, but the basic principles and considerations will remain essentially unchanged.

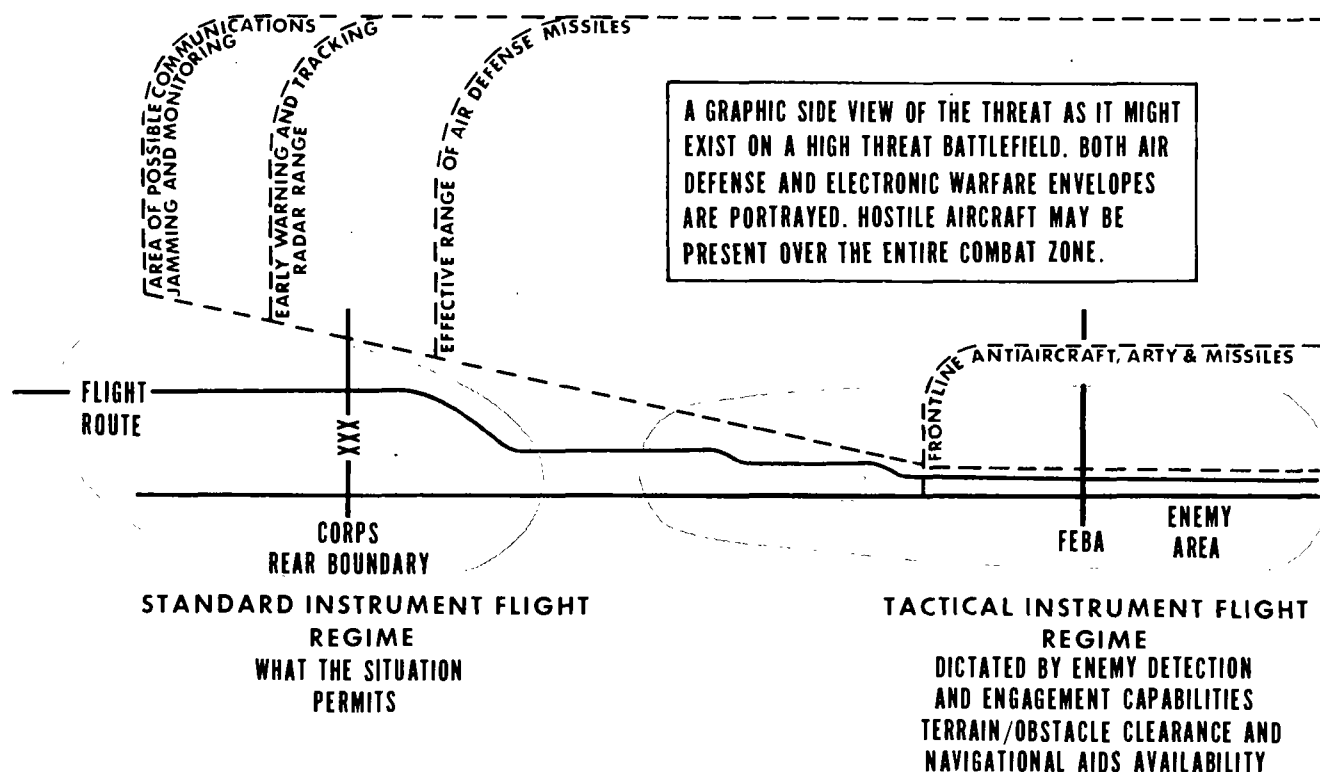


Figure 4-1. Threat profile.

Basic Considerations FLIGHT ALTITUDES

Flight altitudes will be dictated by the enemy air defense threat. The following illustration shows an example of how the air defense threat will appear on the modern battlefield. The illustration graphically shows the relationship of standard instrument flight and tactical instrument flight to the air defense threat and terrain obstacle clearance considerations. The overriding concern in tactical instrument flight is to remain below the enemy air defense threat and continue to maintain a safe altitude above terrain obstacles in order to complete the mission. As the aviator flies toward the forward edge of the battle area (FEBA), he must use SOP and lower flight altitudes in order to remain below the air defense threat. He can use standard instrument flight rules and procedures in rear areas where the *effective range of the enemy air defense missiles* and other weapons does not threaten. Of course, the aviator must constantly be alert to the threat of *possible communications jamming and monitoring* throughout the battle area. Nearer the FEBA he will encounter the range of the enemy *early warning and tracking radar*. It is important for the aviator to be aware of when he is in this radar range. Although he may be beyond the range of ground-based weapons, he may be engaged by enemy aircraft. The aviator should be

transitioning to the lower flight altitudes of tactical instrument flight.

As the aviator moves within the *effective range of the air defense weapons*, he must always remain low enough to avoid acquisition by the early warning and tracking radar. To do so, he must reduce the flight altitude to a level below the enemy threat, yet high enough to provide a safe clearance of terrain obstacles. Naturally, as the aviator flies toward the FEBA the capability of enemy radar to acquire him will continue to increase nearer the terrain. The aviator must continue to adjust his altitude and flight route accordingly to remain below this threat or to be masked by the terrain.

Upon reaching the forward area or the destination point the aviator will use a tactical instrument beacon to make the approach if visual flight (VFR) conditions have not been encountered. If VFR conditions are encountered at the destination, then the aviator will make the approach visually and use terrain flying to continue the mission and to avoid the enemy threat.

Conversely, as the aviator flies from a forward location toward the rear of the battlefield, he can progressively increase the flight altitude to provide an added terrain obstacle clearance safety margin, yet remain below the air defense threat.

Echelon or unit forward or rear boundaries cannot be used as a reliable indication of the altitude to be flown

to avoid the enemy air defense threat since these boundaries are highly mobile and are not always the same distance from the FEBA or subject to the same terrain formations. The unit boundaries depicted on the threat profile illustration are presented only to show how the threat will increase as the aviator flies nearer the FEBA and force the aviator to select lower flight altitudes. Each mission requiring the use of tactical instrument flight must be individually planned and an appropriate altitude profile planned to remain clear of both the threat and terrain obstacles. This may well be accomplished during flight utilizing SOP altitudes and letdowns.

FLIGHT ROUTE

The current threat situation, terrain, and weather will directly affect route selection. In addition, the route navigational facilities must be mobile and highly responsive. Routinely, they must be capable of rapid displacement on short notice to provide support for a tactical instrument flight. Air traffic management personnel can expect to move their equipment as frequently as every 4 hours, if necessary, to avoid enemy electronic detection and to prevent repeated use of the same airspace. Factors that must be considered in establishing tactical instrument flight routes include:

Terrain and Threat

Straight-line flight between takeoff point and destination will be precluded in many instances by both the terrain and the enemy air defense threat. In selecting the flight route, the aviator must carefully analyze the threat as it affects potential flight routes. In most instances, the threat will be the overriding factor in dictating (or limiting) flight routes. Consistent with the threat, the aviator must then make a thorough map reconnaissance of the possible routes to the destination and return to determine the best route which will provide threat avoidance and terrain obstacle clearance. Efforts should be made to use terrain for masking from the enemy threat whenever possible, especially in the more forward areas of the battlefield. In tactical instrument flight, terrain obstacles can serve as valuable assets to deny enemy electronic detection just as they are used for concealment and masking during visual terrain flying.

After selecting potential routes based on the enemy threat and terrain obstacle considerations, the aviator must then consider other factors that will affect his choice of a route.

Navigational Aids

The availability and location of navigational aids will be a significant factor in route selection. Pre-mission planning and briefings should include the exact location and availability of aids to navigation and how they can be used to support the tactical instrument flight.

En route nav aids farther from the FEBA may be relatively easy to coordinate, locate, and use; however, as the nav aid location is nearer the FEBA, availability as well as flexibility of a nav aid may well be limited by the intensity of the fighting and the density of other air traffic. Planning must include provisions for alternate nav aids when available and if the alternate nav aid will still contribute to the completion of the mission. An alternate termination point or letdown nav aid should not be used if it will not contribute to mission accomplishment or provide visual flight conditions. Planning must include navigational aids for the return flight if necessary.

Communications

The enemy will employ highly sophisticated electronic warfare systems. Defeating this capability and protection aviation assets will require maximum tactical ingenuity and resourcefulness. One of the most effective tactics will be to keep radio communications to the minimum. This can be accomplished through the use of arm and hand signals, lights, and SOPs. In selecting a route, communications security and a capability for maintaining communications should be prime considerations. Using terrain to mask the aircraft from possible acquisition by the enemy, early warning radar may also mask the aircraft from nav aids and from communications with friendly units. Routes should be selected which provide reliable communications whenever possible.

APPROACHES

Tactical instrument flight approaches will vary considerably in their sophistication and reliability. Conventional ground controlled and ILS approaches may be used when available. However, because of the dynamics of future battlefields, these sophisticated facilities will be available only in rear areas. Approaches in forward battle areas will more likely be limited to using area surveillance radar, nondirectional beacons, and FM homing. The altitude to which descent can be made will depend on factors such as crew proficiency, aircraft instrumentation, approach nav aids, terrain, and visibility. The ultimate goal of an approach is to allow the aircraft to descend through restrictive weather conditions to an altitude where conditions exist that will permit mission accomplishment. Regardless of the kind of approach, the navigational aid at the letdown point should be oriented so that it emits its signal away from the FEBA in order to minimize enemy detection.

In rear areas where standard instrument flight procedures can be somewhat followed, ground controlled approach (GCA) radar can be used for instrument approaches. However, in the forward areas, the limited availability of GCA equipment

and the more intense electronic enemy threat will make the aviator primarily dependent on lower power nondirectional beacons to aid in the instrument approach and letdown to visual flight conditions. Approaches using FM homing should be used only when an emergency situation exists and the aviator is highly proficient.

Tactical instrument flight approaches may be classified according to facilities as follows:

CLASS I

Approach using ground controlled approach (GCA) or a derivative of the National Microwave Landing System with its distance-measuring equipment. Guidance to the ground is reliable with no minimums required for properly trained aviators in appropriately instrumented aircraft and Air Traffic Management (ATM) personnel trained in installation and operation of the equipment.

CLASS II

Approach using one of the following: An instrument landing system, an area surveillance radar, or a nondirectional beacon. Centerline guidance is reliable with a positive position indication (fix) prior to start of letdown. Descent to 50 feet above ground level is allowed for properly trained ATM personnel and aviators using appropriately instrumented aircraft. Visibility must be such that aviators can proceed visually following the approach.

CLASS III

Approach using FM homer. Reliability of directional guidance and station-passage indication close to station is questionable. Descent altitude is dependent on terrain, and visibility conditions must be such that aviators can operate visually before touching down on continuing the mission. Aviators and ATM personnel must be highly proficient.

NAVIGATIONAL AIDS

Because of the threat in forward areas of the battlefield, it will not be possible to operate navaids full time. Operating nondirectional beacons and surveillance radar navaids full time risks enemy acquisition of both the navaid and the aircraft as targets, or of having the enemy disrupt the mission by jamming the navaid signal. All reasonable means should be used to minimize the time that navigational aids emit a signal. In rear areas where more sophisticated navaids can be used along with standard instrument flight rules, efforts should also be made to limit the signal transmission time to only those times when needed as an aid. In the fast-moving and increased threat environment nearer the FEBA, the limited low power beacons and navaids should

be operated intermittently or only upon request as a standard procedure to lessen the chance of enemy detection. In this austere situation, aviator proficiency and knowledge of the capabilities and characteristics of the navaids are important. Research and development efforts are continually striving to provide more advanced, portable navigational aids to supplement the requirements of tactical instrument flight.

Radio Beacon Set, AN/TRN-30(XE-1)V

One of the latest innovations is the portable Radio Beacon Set, AN/TRN-30(XE-1)V currently used by field units. It transmits a homing signal that can be used in conjunction with the airborne direction finder (ADF) sets AN/ARN-59 and 83 installed in most Army helicopters. The radio beacon set provides an amplitude-modulated (AM) radio frequency signal on any one of 964 channels in the frequency range from 200 to 535 kHz and 1605 to 1750 kHz in tunable increments of 500 Hz.

The range of the beacon depends upon the wattage and configuration of its operation. The beacon can be used in two basic configuration:

Pathfinder. In this mode the system is a low-power, short-range, man-portable direction finder beacon. This equipment will be used in this mode extensively in intermediate and the most forward areas to lessen the chance of enemy detection and provide the greatest degree of flexibility and transportability. In most cases, the aviator will be required to track outbound on a stronger navaid located in a rear area until he is close enough to intercept and use an intermediate low-power beacon en route to the FEBA where he will receive and use a reliable signal from another low-power beacon operating in the pathfinder mode.

Tactical and semi-fixed. In these modes, the beacon is located at a semi-fixed facility and operated at medium to high power. These modes include the basic man-portable radio, a power supply, and an amplifier. In these modes the beacon is used in rear areas for instrument flight en route to and returning from forward locations. The beacon will generally be located beyond the effective range of long-range enemy artillery and emit a signal strong enough to assist in transition to and from tactical instrument flight using low-power beacons. Even though the beacon operated in these modes is located in a semi-fixed rear location, it also will be operated intermittently or on request to reduce the electronic signature and to reduce its desirability as an enemy target for long-range weapons.

FM Homing

FM homing can be used as an emergency tactical instrument navigational aid to serve as a backup in the event the onboard ADF equipment malfunctions or the ground-based nondirectional beacon becomes unreliable or inoperative. In tactical instrument flight, as in

visual terrain flying, it is extremely important for the aviator to remain aware of his position as closely as possible at all times in the event he must resort to emergency backup homing procedures. By knowing his position and using FM homing as an emergency navaid, the aviator can home:

- to an alternate FM transmitter location in order to encounter VFR flight conditions when onboard equipment malfunctions.

- to the original point of departure in order to use an operational or more reliable ground-based navaid.

As a general rule, FM homing should be used only

as an emergency backup navaid to return the aircraft to VFR conditions or to a rear area.

Night Operations Aids

Tactical instrument flight at night is conducted primarily in the same manner as it is conducted in the day. However, during transition from tactical instrument flight to visual flight at the point of letdown, a light source must be present to provide a visual reference point for the aviator. The lighted "T" or a similar reference symbol is ideal. If the landing site is located at a location other than the letdown point, a second light source to assist in landing is also necessary.

CHAPTER 5

ARMY AIR DEFENSE AND FIRE SUPPORT

CONSIDERATIONS AFFECTING AIRCRAFT OPERATIONS

5-1 Army Air Defense

The dominant Army air defense weapons in the rear areas are Hawk and Nike-Hercules. Engagement by these weapons can be under either centralized or decentralized direction, whereas the divisional air defense weapons must operate under decentralized engagement authority. The same rules of engagement apply to all ADA weapons. Hostile criteria to implement the rules are drawn from the theater-listed criteria. Some criteria are designed for use only by the radar-directed Hawk and Nike-Hercules weapons.

Engagement authority for divisional air defense weapons is normally decentralized to the fire unit level on the basis of division SOP and command direction. The division SOP must be compatible with the area air defense commander's published rules and procedures. Application of weapon controls, in accordance with the commander's analysis of the air situation and the theater air defense rules, contributes to effective airspace management.

The air defense rules of engagement are the means by which the commander of the unified command governs the fire of air defense weapons at air targets. The rules should be formulated, disseminated, and exercised before hostilities begin, and must provide for a logical transition from peacetime to wartime conditions. As the quick reaction requirements of the corps air defense forces will not allow the fire units to go back to a higher level of command to obtain identification data and permission to fire, the rules should provide for maximum wartime decentralization of authority to engage hostile aircraft. The rules should exploit the capabilities of the air traffic management system to minimize exposure of friendly aircraft to the friendly air defenses.

The four key elements of the air defense rules of engagement are—

- designation of persons authorized to declare an aircraft hostile,
- specification of criteria by which an aircraft may or must be engaged,
- definition of conditions under which an aircraft may be or must be engaged,
- preservation of the right of individual and collective self-defense under any circumstance.

Weapons Control Status

The degree of fire control imposed upon Army air defense units is referred to as "weapons control status." Any one or a combination of the three standard weapons control statuses defined and discussed below may be used. More freedom to fire at fixed wing

aircraft and less to fire at helicopters can be gained through a combination of these.

"WEAPONS FREE"

"Fire at any aircraft not identified as friendly."

Under this status, hostile aircraft and aircraft of unknown or doubtful identification may be engaged. "Weapons free" may be initiated when no friendly aircraft are in the area or when the commander is willing to accept some risk to friendly aviation in the face of an overriding requirement for air defense of his forces. Joint air defense rules and corps/division policy will specify the levels of command authorized to permit weapons free operations.

"WEAPONS TIGHT"

"Fire only at aircraft positively identified as hostile in accordance with the announced hostile identification criteria." This should be the normal status imposed on divisional air defense weapons and through careful selection of hostile criteria, will provide an effective safety balance to meet most needs.

"WEAPONS HOLD DO NOT FIRE"

The right of self-defense against direct air attack is not denied in peace or war. This right permits engagement of aircraft actually delivering ordnance against the air defense fire unit and friendly units in the immediate vicinity, but precludes engagement of all other aircraft regardless of their actions, identify or apparent intent. This status should be applied selectively with time and area limits, because it is intended to "turn off" the air defense capability. This rule may be used when the commander desires absolute insurance against friendly air defense fires in the area of major friendly air operations. Any force commander employing air defense weapons is authorized to impose "weapons hold" on these weapons.

Hostile Criteria

The Area Air Defense Commander will publish air defense hostile criteria for use in the combat zone. Hostile criteria suitable for use by the visually directed air defense weapons and reflecting the commander's assessment of his air situation and the air threat must be selected from the published theater hostile criteria and placed in SOP. For example, SOP may authorize fire units to classify as hostile any aircraft that engages in one, or a combination, of the activities presented below that constitute hostile criteria:

—Attacking friendly elements.

- Responding improperly to electronic identification, friend or foe (radar) (IFF) interrogation.
- Discharging smoke or spray over friendly elements without prior coordination.
- Dropping flares at night over friendly territory without prior coordination.
- Engaging in minelaying operations without prior coordination.
- Operating at prohibited speeds, altitudes, or directions.
- Improperly entering an area designated as restricted, prohibited, or as an ADA "battle zone."
- Improperly departing from a zone, route, or corridor designated as "safe."
- Employing electronic countermeasure devices; e.g., dropping chaff and reflectors over friendly territory without prior coordination.
- Maneuvering in a manner clearly indicating imminent attack.
- Bearing the military insignia or having the configuration of an aircraft employed by a known enemy nation.

The hostile criteria will form the basis for air defense gunner engagement decisions and will also inform pilots how to avoid acts that may result in a hostile classification.

The following table provides examples of hostile criteria for weapons-tight operations in two air threat situations — major and minor helicopter threat. The criteria do not apply under weapons-hold status. The determination of "major" versus "minor" is a theater-level function, based on the joint force commander's appreciation of the risks involved. His decision is expressed in the approved rules of engagement and hostile criteria.

Hostile criteria ¹	Helicopter Major	Threat Minor
Helicopter considered hostile if—		
• Attacking friendly elements ²	Yes	Yes
• Bearing insignia/configuration of enemy aircraft ³	Yes	No
• Discharging smoke and spray without coordination	Yes	No
• Discharging parachutists without coordination	Yes	No
• Improperly entering restricted areas	Yes	No
• Unloading troops without coordination and bearing insignia/configuration of enemy aircraft	Yes	Yes

¹ Each alone is sufficient evidence to warrant a hostile identification.

² This is more than simple "self-defense."

³ This is the pure form of visual identification and demands the most training.

5-2 Fire Support

Objective

The objective of the field artillery is the destruction or neutralization, through continuous and timely fire support, of those targets that jeopardize the accomplish-

ment of the force commander's mission. Detailed information on the employment of field artillery may be found in FM 6-20.

Airspace Coordination

The Army command and control system does not possess the capability to collect, categorize, and disseminate timely artillery information with respect to intensity, duration, location, and maximum ordinate of friendly fires throughout the entire tactical area of operations. The highest probabilities of conflict between aircraft and indirectly delivered supporting fires occur at relatively low altitudes in the immediate vicinity of firing unit locations and target impact areas. With the exception of these two areas, the probability of conflict between aircraft and indirect fires is relatively low. Indirect fires will not normally be interrupted because of potential conflict with aircraft traffic.

Consistent with mission requirements, tactical aircraft will avoid areas of high-risk, indirect-fire conflict. Conversely, high-priority tactical aircraft missions will not be delayed because of potential conflicts with indirect fire support.

Coordination of indirect fire support with other airspace activities should be effected to the maximum extent possible, consistent with mission objectives and systems' capability. To reduce the potential risk of conflict posed by significant concentrations of preplanned indirect fires and aircraft, the requirement exists for coordination of information pertaining to indirect fire support activity with the applicable airspace management facilities. Since the reporting indirect fire support data would not be timely, coordination procedures must be based primarily on pre-established fire plans and fire unit locations, updated to the maximum extent possible and consistent with Army artillery system capabilities and airspace management requirements.

Special Weapons Warning Procedures

Messages warning of the impending use of special weapons must be transmitted to Air Force and Army aviation units so that all friendly aircraft can avoid the overpressures and the risk of flash blindness (dazzle) resulting from the burst. These warnings can be transmitted directly from the brigade command post to the Air Force direct air support center, to the FCC through the aviation section, and to the fire support warning center. Troops are warned through command channels. This procedure does not guarantee that every individual within sight of the burst will be notified; however, it does provide warning for those elements that would be directly affected, including aircraft in the area, in time for them to react.

Attack Helicopter Firepower

Organic Army attack helicopters perform most of their tasks in forward areas where coordination of VFR flights for ATM purposes is minimal. Since their prim-

any mission involves the delivery of direct aerial firepower, their operations are largely restricted to VFR conditions. Command and control of aerial field artillery are subject to airspace coordination rules and SOP applicable to Army aircraft in the forward area, to include maintaining a listening watch to receive notice of planned operations involving the use of airspace. Coordination of units providing aerial firepower with other services providing close air support to land forces is accomplished primarily through communication with the forward air controller (FAC) or the fire support coordinator (FSCoord) at that level.

Support From Other Services

Requests for other services to support Army forces, to include close air support and naval gunfires, are coordinated in the tactical operations center or fire support coordination center at the appropriate level. Information affecting aircraft operations in the forward combat area is relayed from the tactical operations center or fire support coordination center to the ATM facilities concerned. On the basis of this information, the ATM facilities take necessary action to manage aircraft operations at the affected time and place.



CHAPTER 6

STABILITY OPERATIONS

6-1 Army Air Traffic Management Support Requirements

Army ATM activities in a stability operation are directly dependent upon the extent to which Army forces, particularly Army aviation forces, are committed to each operation. Although only the minimum ATM elements required for mission accomplishment should be used, they must be sufficient to provide continuous ATM support during the frequent displacements that are necessary in stability operations. Also, in determining ATM support requirements, consideration should be given to the physical configuration of the theater of operations which can differ greatly from, and cause a greater requirement for, ATM facilities than that encountered in more conventional operations.

6-2 Allied Force Operations

Where US Forces operate as part of a combined force containing military elements of Allied Nations, the combined force commander will establish the basis for allocation of airspace authority to elements of the combined force. For those areas in which airspace management is conducted by participating Army forces, ATM services will be provided by Army elements as discussed in chapters 3 and 4.

6-3 Host Country Considerations

General

When US Forces are participants in military operations conducted in a host country, policies for the use of airspace by US forces normally are developed through agreements between the US Joint Force Commander and representatives of the host country government. These agreements may specify that all airspace over the host country will remain under control of the host country government, with operational control of certain airspace being delegated to the authority of the US Joint Force Commander. The host country may delegate other airspace areas to the authority of host country civil and military organizations, together with responsibility for providing ATM services for their areas. Thus, since several different organizations may become involved in ATM activities, it is necessary that the ATM facility established in each area be compatible with each of the other ATM facilities operating in the host country.

Host Country Aviation

Host country civil and military aircraft flights in areas not delegated to US or other authority are conducted in accordance with ATM procedures established by the host country organization concerned. Flights by these aircraft into airspace delegated to US military authority are regulated by ATM procedures estab-

lished for each area by the service concerned in accordance with guidance from the joint force commander through the airspace management authority.

Security

Military aircraft operations habitually are oriented toward the use of security measures such as the controlled use of radios and lights. Civil aviation operations may be less oriented toward the use of such security measures. This could result in acquisition by the enemy of information for use in countering civil aviation operations, or for use against military installations and operations in the same or nearby areas. Adequate procedures must be established to insure that all military and civilian aircraft operating in the airspace that has been delegated to the responsibility of the joint force or component force commander will comply with existing security measures.

6-4 Army Air Traffic Management Procedures

Army ATM procedures used in stability operations are those procedures established for conventional tactical operations, adjusted to meet the requirement of the environment in which the operations are being conducted. Regardless of the adjustments necessitated by the tactical environment, the Army ATM system will be based upon the general principles established in preceding chapters of this manual.

Since the procedures used by the FOC and FCC in controlling aircraft traffic generally are the same as those used in more conventional operations, an Army aviation traffic control unit usually is adequate to establish and operate an Army ATM system for stability operations. Elements of the control unit may establish airways for use by air traffic between tactical areas of responsibility, with those areas being controlled by ATM elements organic to the force occupying each area.

For aircraft operating in areas adjoining a tactical area of responsibility, the responsible ATM facility may provide a flight-following service. The primary function of this service is to provide a record of the general area in which specific aircraft are operating, and the time at which voice radio reports are to be made to the ATM facility for use as a basis for alerting search and rescue elements when necessary. Also, the ATM element uses knowledge that these flights are being conducted to provide information to aircrews regarding friendly or enemy operations which may affect the flights.

6-5 Other Considerations

The poor road networks and rugged terrain often associated with stability operations increase the require-

ment for Army aviation support of land combat forces. Where land forces are located in scattered positions throughout the combat zone, freedom of movement of Army aircraft transporting troops and materiel between these points must be maintained.

Stability operations are normally characterized by a reduced air threat. This permits other service aircraft, which normally would be used to counter the enemy air threat, to be used to increase the close air support capability. The increased close air support capability, scattered areas of troop disposition, and increased requirement for surface-to-surface fire support necessi-

tate the close coordination of all fire support activities of the participating services. Accordingly, elements of the TOC may be required to broaden their functions and become more involved in the minute-by-minute coordination which is essential to this type of operation.

Where road nets are inadequate or not under the control of friendly forces, there will be increased dependence on air lines of communication for delivery of supplies and equipment. This may require the establishment of special airways for the exclusive use of aircraft.

APPENDIX A REFERENCES

A-1. Joint Chiefs of Staff Publication (JCS)

Pub. 8 Doctrine for Air Defense from Overseas Land Areas.

A-2. Army Regulations (AR)

95-series	Army Aviation.
310-25	Dictionary of United States Army Terms.
310-50	Authorized Abbreviations and Brevity Codes.

A-3. Field Manuals (FM)

1-1	Terrain Flying.
1-5	Instrument Flying and Navigation for Army Aviators.
1-55	Guide for the Operation of Army Airfields.
1-105	Aviators' Handbook
6-20	Field Artillery Tactics and Operations.
44-1	US Army Air Defense Artillery Employment.
90-1	Employment of Army Aviation Units in a High Threat Environment. (to be published)
100-15	Larger Unit Operations.
100-44 (TEST)	Army Procedures for Airspace Management in a Combat Zone.
101-5	Staff Officers' Field Manual: Staff Organization and Procedure.

A-4. Training Circulars (TC)

TC 1-28 Rotary Wing Night Flight.



APPENDIX B

EXAMPLE OF DIVISION STANDING OPERATING PROCEDURES FOR AIR TRAFFIC MANAGEMENT

Example B-1. Division Air Traffic Management

Standing Operating Procedures

(Classification)

25th Armd Div
Fort Rucker, Alabama
6 June 197__

STANDING OPERATING PROCEDURES

NO 1

AIR TRAFFIC MANAGEMENT

Section I

GENERAL

1. References: Annex A (References).
2. Purpose: To establish procedures for the coordination, integration, and regulation of air traffic in the division area of operations (AO).
3. Concept:
 - a. The Commander, 29th Tactical Air Force (29TAF), is designated the area airspace management authority (AAMA) and the area air defense commander. The provisions incorporated in these standing operating procedures (SOP) are in accordance with the airspace management procedures established in the 29TAF tactical standing operating procedures (TSOP) and the I Corps TSOP. The division airspace management element (DAME) will continually coordinate with the corps airspace management element (CAME) to insure an unimpeded flow of essential information concerning the use of airspace in the division area of operations (AO).
 - b. The DAME develops and coordinates procedures for the use of airspace directly under the control of division. Air traffic management priorities and execution details will be identified in the airspace utilization annex to the division plans/orders.
 - c. The DAME is a manual planning and management facility with limited information-handling capabilities; therefore, the principle of resolving potential user conflicts by plans and SOP is emphasized. Plans and SOP will delegate the necessary authority to the lowest possible level of command for taking action to resolve an observed conflict. The provisions of these SOP will be followed during all command post exercises/field training exercises to promote familiarity with procedures.

Section II

COMMAND AND STAFF RELATIONSHIPS/RESPONSIBILITIES

1. Command:
 - a. I Corps. The CAME serves as the focal point at corps for the coordination of air traffic management.
 - b. 25th Armd Div. The Commander, 25th Armd Div, is responsible for conducting air traffic management for the division.

(Classification)

(Classification)

(SOP 1 — 25th Armd Div)

c. Brigade/Battalion. There is no requirement for a special staff element at maneuver brigade or battalion dedicated to air traffic management. The maneuver commander is responsible for coordinating his airspace activities when those activities may impact on other airspace users.

d. 1st Bn (Hawk, SP), 214th ADA. The Hawk battalion is designated in direct support of the division. The commander will locate Hawk fire units to facilitate the accomplishment of division priorities and to accommodate air traffic management functions, as cited in Annex B (Integration Plan — AADCP with an FCC element). The following are special requirements for the air traffic management function:

(1) Insure that the division air defense officer and DAME are provided low altitude radar coverage diagrams as soon as possible to facilitate air defense coverage and air traffic management integration.

(2) Coordinate all area air defense matters with the Chaparral/Vulcan liaison officer to include air defense warnings, weapon control status and rules of engagement changes, and hostile and friendly aircraft data.

(3) Provide a liaison team to operate in the division tactical operations center.

2. Staff: Staff responsibilities and command relationships are as specified in FM 101-5, unless otherwise indicated in these SOP.

a. ACofS, G3, Operations. The ACofS, G3, will insure that these SOP are kept current and that they are followed during training exercises at all levels. He exercises staff supervision over air traffic management and the DAME and insures that appropriate instructions pertaining to air traffic management are published in the airspace utilization annex. He will insure that all necessary personnel required to staff the DAME are represented in the division tactical operations center and that necessary communications are available for mission accomplishment. In coordination with the ACofS, G2, he recommends to the commander the minimum number of aircraft that should constitute a multiple flight and provides for the planning to positively control and coordinate such flights with the air defense forces.

b. ACofS, G4, Movements. The ACofS, G4, will provide the DAME with supporting airlift information pertaining to air traffic management to include—

(1) Preplanned and immediate airlift support requests and the priorities of approved requests.

(2) Location of logistic installations.

(3) Other combat service support information, as required, relating to air movements.

c. ACofS, G2, Intelligence. The ACofS, G2, will provide the DAME with intelligence information pertaining to air traffic management to include—

(1) Enemy air defense capabilities and threat to include radar range/altitude coverages and missile/gun capabilities.

(2) Enemy air threat (number, type, tactics, and capabilities of aircraft).

(3) Location of enemy nuclear, biological, or chemical attacks.

(4) Possible enemy capabilities to counter air traffic management aids, such as communications, radars, and beacons.

(5) Possible enemy tactics for employing aircraft in the division AO.

(6) Likely enemy aircraft avenues of approach.

d. Air Defense Officer. The division air defense officer is the Commander, 1st Bn (C/V, SP), 141st ADA. To assist in the division air traffic management effort he will—

(1) Provide ADA personnel and necessary equipment to staff the air defense element of the DAME.

(2) Provide liaison personnel to the 1st Bn (Hawk, SP), 214th ADA, Army air defense command post (AADCP).

(Classification)

(Classification)

(SOP 1 — 25th Armd Div)

(3) Inform the DAME of AADCP and fire unit locations.

(4) Provide the DAME and the Hawk battalion AADCP with alert information derived from the forward area alerting radar (FAAR) and/or forward area Chaparral/Vulcan crews.

(5) Advise the commander on all matters pertaining to division air defense, to include recommending air defense priorities.

(6) Coordinate with the Hawk battalion to insure integration of the Hawk and short-range air defense (SHORAD) weapons.

e. Aviation Officer. The division aviation officer serves as the principal aviation advisor to the division. To assist the DAME he will—

(1) Arrange for aviation personnel and necessary equipment to staff the aviation element of the DAME.

(2) Arrange for a flight coordination center (FCC) element to integrate with the 1st Bn (Hawk, SP), 214th ADA, AADCP.

(3) Determine flight plan requirements for division aircraft operating under instrument meteorological conditions and visual meteorological conditions.

(4) Establish procedures for integrating aircraft entering or leaving division AO.

(5) Recommend positioning of navigational aids and procurement of additional aids as required.

(6) Coordinate with the CAME for integrating the division FCC with flight operations center (FOC)/control and reporting center (CRC)/control and reporting post (CRP) facilities.

(7) Recommend IMC or VMC minimums under which division aircraft should operate.

(8) Recommend the site of the division main airfield and the requirement for a terminal control zone and positioning of the FCC (-).

(9) Establish the air traffic regulation system for the division and disseminate this information to all aviation elements operating within the division AO.

f. Fire Support Coordinator. The fire support coordinator for the division is the Commander, 25th Armd Div Arty. He provides the following airspace management information to the DAME through the fire support element.

(1) Location of nuclear fires and significant preplanned indirect fires.

(2) Field artillery battery locations.

g. Electronic Warfare Officer (Assistant G3, Operations/G2, Intelligence). The electronic warfare officer will—

(1) Provide the DAME with estimates on enemy jamming capabilities and location of emitters when known.

(2) Provide the DAME with time and location of jamming operations by division elements or by higher headquarters that may affect division air traffic management facilities or aids.

(3) Inform the DAME of other electronic warfare activities that might impact on air traffic management.

(4) Be prepared to react to hostile or friendly electronic warfare activities that degrade the air traffic management system.

h. Chemical Officer. The chemical officer will provide the DAME with information concerning—

(1) Friendly and enemy nuclear strikes with effective wind messages.

(2) Radiation fallout plots.

(3) Enemy employment of nuclear, biological, and chemical weapons.

(Classification)

(Classification)

(SOP 1 — 25th Armd Div)

Section III

FUNCTIONS

1. Division Tactical Operations Center: The division tactical operations is the command installation in which necessary personnel and communication facilities are centralized to plan, control, and coordinate tactical operations. Within the division tactical operations center are located the elements necessary to coordinate air traffic management functions. The chief of staff will insure that sufficient space is provided in the division tactical operations center for collocation of the DAME, fire support element, and tactical air support element. The DAME serves as the focal point for coordinating air traffic management activities at the division and with adjacent and higher headquarters. The officer-in-charge, division tactical operations center, has the authority to resolve conflicts.

a. Division Airspace Management Element. The DAME receives information and requirements necessary for the management of airspace in the division AO through coordination with CAME, fire support element, tactical air support element, aviation officer, air defense officer, G2/G3 elements, and liaison personnel. This list of personnel and elements should not be construed as limiting the DAME sources of information. Staffing of the DAME will be that recommended for the air traffic control element in FM 101-5. The DAME will—

(1) Through the correlation of air traffic management information and data received, identify and resolve potential conflicts concerning the use of airspace within the division AO.

(2) Develop and maintain the air traffic utilization map.

(3) Develop and maintain recommended minimum risk routes through the division AO and provide to the CAME on request.

(4) Maintain current information on all restricted areas, standard use Army air routes, flight corridors, air defense weapons-free zones, significant preplanned field artillery fires and nuclear strikes, airmobile operations, other major aviation operations, and preplanned close air support strikes and reconnaissance missions.

(5) Relay information concerning air defense warnings, weapon control statuses, rules of engagement, and identification criteria pertaining to air defense and Army aviation activities within the division AO.

(6) Maintain a current picture of the air defense and aviation posture within the division AO and advise the commander and staff on such matters.

(7) Maintain the status of required air traffic management aids and disseminate information concerning their location/use as required.

(8) Coordinate with the CAME concerning establishment of and changes to coordinating altitudes.

(9) Inform division units of the number of aircraft designated as constituting a multiple flight and relay changes as they are received from the ACofS, G3.

(10) Disseminate information as obtained concerning enemy air and air defense activity.

(11) Coordinate all requirements for flight plans, restricted areas, air defense artillery weapons-free zones, and flight rules and procedures.

(12) Coordinate division requirements for airfield and terminal control zones with the CAME.

(13) Provide airspace management information relevant to development of air movement plans and insure that airlift requirements for use of air traffic are included in air traffic utilization annexes to operation plans and orders.

b. Fire Support Element. The fire support element will provide to the DAME—

(1) Location of the fire support coordination line.

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(2) Information concerning location of significant preplanned indirect fires (major preparation and final defensive fires) and nuclear strikes.

(3) Location of significant immediate fires.

(4) Location of major fire units (battery and higher) as soon as they are known.

c. Tactical Air Support Element. The tactical air support element, in cooperation with the tactical air control party, will inform the DAME of Air Force activity within the division AO and of any Air Force aircraft passing through the division AO.

(1) G2 air informs the DAME of all preplanned reconnaissance flights that will penetrate the airspace over the division AO. Information must include time, route of flight, altitude, number of aircraft involved, and electronic countermeasures to be employed.

(2) G3 air informs the DAME of all preplanned and immediate tactical air requests in the division AO. Information must include location, time and duration of strike, number of aircraft involved, and electronic countermeasures to be employed.

2. Division Flight Coordination Center: The division FCC is responsible for providing en route, flight-following service for Army aircraft within the division AO and serves as a point of access into the Army Air Traffic Regulation and Identification System. As a minimum, flight-following services will be provided for aircraft crossing airspace control lines or the air traffic control line. The FCC will be positioned to provide maximum coverage to aircraft operating in the division AO. The FCC will—

a. Take necessary action to resolve observed conflicts concerning the use of airspace.

b. Integrate aircraft entering the division AO.

c. Receive en route air traffic from and hand over traffic to adjacent air traffic control facilities.

d. Relay information concerning air traffic management as required by the DAME.

e. Maintain current status of terminal facilities, navigation aids, restricted areas, coordinating altitudes, standard use Army air routes, and other information pertinent to the air traffic operations.

f. Notify the FOC of division aircraft proposing penetration of the coordinating altitude.

3. Army Aircraft:

a. Army aircraft assigned/attached to division and operating within the division AO will not be required to file flight plans with the division FCC. Employment of Army aviation in the brigade AO may require terrain flying techniques under the control of the brigade commander. Aviation unit operations will provide advance entry information to aircraft entering the brigade area. Aircraft operating within the division AO may request flight following from the FCC. Pilots will be familiar with the supported unit's tactical situation.

b. Army aircraft intent on entering or leaving the division AO will file flight plans with the FCC or the FOC as appropriate. These flight plans may be filed through unit operations or by radio with the FCC/FOC.

c. Army aircraft operating under VMC within the division AO do not require air traffic control en route clearances.

d. Army aircraft operating under standard IMC will be provided clearances from the appropriate air traffic control facility whenever possible (FCC in the division AO, FOC/CRC/CRP in the corps rear operations area).

e. Aircraft conducting tactical instrument flight must be prepared to calculate

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their own flight altitude, allowing for adequate obstacle clearance, and clear themselves for tactical instrument flight in the absence of an air traffic control facility. Units establish SOP for tactical instrument flight in forward areas beyond the control of an air traffic facility.

f. Army aircraft penetrating above the coordinating altitude will notify the FCC either by direct communication or through unit operations. Notification will be made as far in advance as possible.

g. On request, Army aircraft may obtain radar-supported emergency en route advisory services from the AADCP/FCC element.

4. Communications: Annex C (Communications).

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G3

Annexes: A — References (omitted)
 B — Integration Plan - AADCP with an FCC Element (omitted)
 C — Communications (omitted)

Distribution: A

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APPENDIX C

EXAMPLE OF UNIT TACTICAL INSTRUMENT STANDING OPERATION PROCEDURES FOR AIR TRAFFIC MANAGEMENT

Example C-1. Unit Tactical Instrument Standing Operating Procedures for Air Traffic Management (Classification)

82d Aslt Hel Company
1st Cbt Avn Battalion
Fort Rucker, Alabama
15 October 197—

STANDING OPERATING PROCEDURES NO 12

TACTICAL INSTRUMENT PROCEDURES FOR AIR TRAFFIC MANAGEMENT

Section I

GENERAL

1. References:

- a. 82d Aslt Hel Co Tactical SOP
- b. 1st Cbt Avn Bn Tactical SOP
- c. 25th Armd Div Air Traffic Management SOP
- d. FM 1-1, Terrain Flying
- e. FM 1-5, Instrument Flying and Navigation for Army Aviators
- f. FM 1-60, Army Air Traffic Management in the Combat Zone

2. Purpose: To establish procedures for the planning, conduct, and regulation of tactical instrument flight as part of air traffic management in the forward area.

3. Concept:

a. The corps airspace management element (CAME) develops and coordinates procedures for use of corps airspace. The division airspace management element (DAME) develops and coordinates procedures for the use of airspace directly under the control of the division.

b. The division flight coordination center (FCC) provides standard and tactical instrument flight clearances and following when feasible and available.

c. Mobile elements of the division FCC are deployed to forward locations to extend the flight coordinating and monitoring capability within the division. These mobile elements can collocate with tactical ground unit aviation sections in order to use their communications nets whenever necessary and possible.

d. Aviation elements operating in forward battle areas will encounter instrument flight conditions and be required to conduct tactical instrument flight even though beyond or outside the communication range of an FCC element.

e. Of necessity, navigational aids will be limited and must be highly mobile. Routinely, they will be moved often to avoid enemy electronic detection and destruction, and to provide rapid response to tactical instrument flight requirements. Close coordination is required to insure the mobile beacons are located and operated to best support a tactical instrument flight mission.

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Section II

FLIGHT PLANNING

1. This SOP is established as a checklist to insure complete and thorough premission tactical instrument flight planning and air traffic management.

2. Operations:

a. Mission requirements. Analyze the mission to determine all inherent requirements. For example, a single or multiple aircraft or multiple sortie mission will affect the entire planning process. Determine air traffic control requirements necessary to support the mission.

b. Operations/intelligence.

(1) Obtain a current threat briefing from the operations officer. Check the "shot at" file to identify the most current enemy threat.

(2) Familiarize yourself thoroughly with locations, identifications, and postures of friendly units in your AO.

c. Frequencies and call signs. Insure that CEOI information is current and complete and navigational aids can be established and maintained where you need them.

d. Weather information. Check weather information and forecast in the AO. Particular attention should be focused on wind information at point of departure, en route, and at the terminal points. Surface winds should be used. Division artillery can serve as a weather source in the absence of any other more formal sources.

3. Map study/analysis:

a. Route selection. Conduct a detailed map study to determine the best possible route that contributes to mission accomplishment. Select primary, alternate, and return routes based on the following factors:

(1) Select the route which affords maximum concealment and masking from the air defense threat.

(2) Locate and plot prominent terrain features and obstacles.

(3) Determine and coordinate navaid requirements and flight clearances, when possible. In the absence of an air traffic control facility, plan for clearing your own flight and arranging for flight-following with other aviation or ground units along the route. Early coordination and planning insures maximum reaction time by supporting nav aids forward air traffic management elements.

b. Flight altitudes. Determine the minimum safe flight altitude for the selected routes. In the event an air traffic control or clearance facility is not available, you must be prepared to provide and insure your own terrain obstacle clearance. Map analysis is the primary source for determining altitude information.

(1) Altimeter setting. Insure the aircraft altimeter is set to the correct terrain elevation. Current altimeter setting information may not be available other than that obtained from map study and correlation with the aircraft location on the ground.

(2) En route and approach minimums. In the absence of standard, published en route and approach diagrams, map study determines clearance altitudes en route and letdown minimum altitudes at the approach. Use an en route and minimum descent altitude of 400 feet above the highest obstacle in the flight buffer zone for a safe tactical instrument minimum altitude.

c. Navigation preplanning. Knowledge of the terrain throughout the AO is necessary in order to be able to cope with unexpected changes during the flight.

d. Refuel/rearm requirements. Fuel requirements must be determined and plans made for intermediate refuel stops. Additionally, rearming considerations must be integrated into the plan as appropriate.

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e. Magnetic conversion. A significant error can result if you fail to convert grid azimuths to magnetic azimuths.

4. Equipment requirements:

a. Maps and navigational aids. Conduct a complete inventory to insure all maps or navigational aids are present for the mission.

b. Aircraft equipment. Compute weight and balance, check performance charts, and secure special mission and survival equipment as necessary.

Section III

FLIGHT CLEARANCE AND FOLLOWING

1. Controlled area to uncontrolled area. When flying from a rear controlled area to a forward uncontrolled area, the aviator maintains contact with the FCC facility as long as possible and then assumes responsibility for making contact with other tactical forward units for flight-following.

2. Uncontrolled area to controlled airspace. The aviator serves as his own initial clearance authority and attempts to make contact with rear area FCC elements en route. The flight should follow closely the previously planned and coordinated flight plan.

3. Flight initiated from unit heliport or airfield.

a. Clearance for tactical instrument flights is secured from the division FCC element through the company operations prior to takeoff if communications exist.

b. When radio contact is not possible or feasible, contact the FCC element by landline prior to takeoff for flight filing and clearance. Landline communication is normally possible through the switch at the next higher supported unit headquarters.

4. Flight originating from a tactical site.

a. In the event tactical instrument flight is required from a forward tactical location, such as a FARRP, and communication cannot be established with an FCC facility, the aviator must serve as his own initial clearance authority.

b. As soon as practical after the flight is initiated the aviator should attempt to establish radio contact with an FCC element or a ground tactical unit to relay the flight plan. He should follow the original tactical instrument plan as closely as possible until either direct contact with an FCC element is made or a ground unit relay is established.

5. Inflight transition from terrain flying to tactical instrument flight. When the tactical mission requires the transition from VFR to tactical instrument flight, the aviator must carefully analyze his map to select a route and altitude to provide obstacle and terrain avoidance.

a. Communication with an FCC element is not possible. The aviator serves as his own clearance authority until direct communication with an FCC element is made or contact with a ground unit relay is affected.

b. Communication with an FCC element is possible. Report location and intended flight plan. Maintain direct FCC communications as long as possible until flight termination. If en route communication is lost, follow the reported flight plan as closely as possible until contact is regained (either direct or through a relay) or the flight is terminated. If communications with the FCC element cannot be reestablished, flight-follow with a ground tactical unit.

6. Flight in a severe electronic warfare (EW) threat or radio silence environment.

a. Of necessity, much of tactical flight will be conducted in a severe EW threat environment. To avoid electronic detection in forward areas, nav aids must be

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restricted to operation only when they are to be used, and then only intermittently. In order to avoid detection and destruction, the electronic signature of navigation aids and aircraft must be kept to a minimum, thereby making radio silence a requisite for mission accomplishment.

b. Aviators will use landline communications when available for coordinating and clearing tactical instrument flights with an FCC element prior to takeoff. If landline communication is not possible, use secure radio channels. Close initial coordination with the FCC element is essential prior to initiating the flight in order to eliminate unnecessary radio communications during flight.

c. During a radio silence environment, voice radio communication for navigation and flight-following are not possible. The aviator must coordinate in detail prior to takeoff when possible, serve as his own clearance authority during inflight transitions from VFR to tactical instrument flight, and often operate without a flight-following facility or unit while en route.

Section IV

TYPICAL MISSIONS

1. Corps area to a forward brigade location.

a. A utility helicopter pilot plans the flight using the SOP checklist. He determines his routes, minimum flight altitudes, and navigational aids requirements. Coordination with the corps area FOC/FCC is effected to insure flight-following and navigational aids are emplaced and operational in forward areas when they are needed. The flight clearance is received and the aviator departs the basefield.

b. En route, the aviator is kept under both communications and radar flight-following contact. As he progresses forward, it is necessary to transition to a lower flight altitude in order to avoid enemy air defense detection and destruction. Radar contact is terminated but voice communication is maintained by the division FCC.

c. Moving farther toward the front, the aviator descends to the minimum en route altitude (MEA) (previously determined from map study) in order to remain below the air defense threat. Contact is lost with the division FCC element. Consequently, the aviator establishes contact with the forward brigade aviation section for flight-following. He requests weather conditions in the area and directs that the navaid be turned on.

d. After tracking inbound and arriving at the brigade location, the aviator initiates the preplanned approach to the portable nondirectional beacon. During descent to the minimum descent altitude (MDA), he breaks out of the low clouds and visually makes the landing.

2. Forward brigade location to the corps rear.

a. An observation helicopter pilot plans a flight from the air cavalry troop location near the FEBA. By conducting a thorough map reconnaissance, the aviator selects the route and determines the minimum en route altitude. Contact with an FCC element cannot be made prior to takeoff but communications with the forward supported brigade confirm the location and operation of an en route navigational beacon at the brigade aviation section location. The flight route is modified to use this beacon.

b. After executing an instrument takeoff into IFR conditions, the aviator flies at the minimum safe altitude that insures terrain and obstacle clearance, yet minimizes the possibility of enemy air defense weapon detection. Early attempts to establish contact with an FCC element are not successful, but contact with the brigade aviation section is maintained and relayed to the FCC by landline from the brigade aviation section.

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c. As the observation aircraft proceeds farther toward the rear area, the aviator continually selects a higher altitude to widen the safety margin above the terrain. Contact is established with the division FCC and subsequent radar contact is made. Flight-following and routing information is transmitted to the aircraft by the FCC to insure traffic separation.

d. At or near the division rear boundary, the observation aircraft is handed off to the corps FOC/FCC for flight-following to the termination point. At the termination airfield, a GCA approach may be initiated if visual conditions are not encountered.

3. Return to forward area refuel/rearm point (FARRP).

a. In order to provide timely attack helicopter firepower in defense of the forward battle areas, attack helicopters must return to the FARRP to refuel and rearm. Because of deteriorating visibility conditions, reliance on tactical instrument flight is necessary since the FARRP location is rapidly being enveloped with a low cloud layer. Attack helicopter pilots conduct a thorough map reconnaissance while in the air to determine minimum en route altitudes and minimum descent altitudes at the FARRP location.

b. Since no flight coordination facility is located in the vicinity, the pilots must clear themselves into IFR conditions in order to return to the FARRP. Radio contact with the FARRP is made and a portable nondirectional beacon (NDB) is operational there. The aviators fly into the poor visibility conditions using tactical instrument flight. Flight-following and monitoring en route is maintained by both the unit and the FARRP personnel.

c. Upon arriving over the NDB, the attack helicopter initiates a spiraling approach and breaks out within sight of the fuel and ammunition supply point.

d. After refueling and rearming, the attack helicopter crews return to the forward battle area by flying outbound from the NDB located at the FARRP. After returning to visual flight conditions, the attack helicopters use terrain flying to return to attack positions to continue the battle.

Section V

COMPANY OPERATIONS FUNCTIONS AND RESPONSIBILITIES

1. Provide operational flight planning assistance and information to company aviators planning and conducting tactical instrument flight.

a. Determine air traffic control requirements necessary to support the unit mission or a specific flight.

b. Maintain a current operations/intelligence threat briefing for company aviators to be used in flight planning.

c. Insure current FCC element and tactical unit CEOI information is posted.

d. Maintain an up-to-date navigational aids availability status for use in planning tactical instrument flight routes.

e. Maintain a current weather chart.

f. Maintain the current altimeter setting and insure that it is available in tactical unit CPs and FARRPs in the local area.

g. Maintain a reserve of tactical maps of the AO with prominent terrain and obstacles marked for use in planning tactical instrument flights.

2. Provide the primary and initial point of contact with the division FCC element to coordinate tactical instrument flight plans and clearances.

a. Establish and maintain a communication link with the division FCC element.

(1) Use existing landline nets where possible to coordinate flight plans and

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clearances. Normally, landline communication links through the next higher supported unit provide a connection with the division FCC element.

(2) If landline communication is not possible, use secure radio channels to division FCC elements. Use relays through adjacent units when necessary.

b. Coordinate flight plans and clearances to support the unit mission or a specific flight plan.

(1) Contact and obtain flight clearances from division FCC elements when possible.

(2) Coordinate with adjacent units to relay flight information to division FCC element when necessary.

3. Coordinate placement and use of navigational aids and flight-following.

a. Coordinate with division FCC elements for the placement and relocation (if necessary) of tactical navigational aids or beacons as necessary to support the unit mission or a specific tactical instrument flight.

b. Coordinate with FCC elements and other tactical units, both air and ground, as necessary to provide flight-following and the local altimeter setting for the unit or a specific flight.

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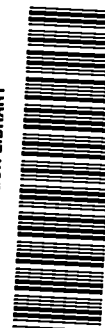
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